

March 1, 1941

VOLUME 103

A Bill Brothers Publication

NUMBER 6

INDIA RUBBER WORLD

CONTENTS

DEPARTMENTS

	Pages
Editorials	50
What the Rubber Chemists Are Doing	51
New Machines and Appliances	53
Goods and Specialties	55
Rubber Industry in United States	56
Canada	63
Obituary	64
Financial	65
From Our Columns	65
Rubber Industry in Europe	66
Far East	68
Book Reviews	70
New Publications	70
Rubber Bibliography	73
Trade Inquiries	82
Patents	84
Trade Marks	86
Legal	88

MARKET REVIEWS

Crude Rubber	75
Reclaimed Rubber	76
Rubber Scrap	76
Compounding Ingredients	79
Cotton and Fabrics	82

STATISTICS

Canada, Twelve Months Ended December, 1940	91
United States and World, of Rubber Imports, Exports, Consumption, and Stocks for November, 1940	92
Imports by Customs Districts	91
Latex	88
Production, Tire	90
Reclaimed Rubber	76
Rims Approved and Branded by The Tire & Rim Ass'n, Inc.	90
World and United States of Rubber Imports, Exports, Consumption, and Stocks	76
Net Imports of Crude Rubber	90
Shipments of Crude Rubber from Producing Countries	86
CLASSIFIED ADVERTISEMENTS	87
ADVERTISERS' INDEX	94

ARTICLES

Pipe Test for Rupture Resistance of Pneumatic Tires	ARTHUR H. NELLEN 33
Neoprene Type KN	34
Facts about the U. S. Rubber Industries	35
Properties of Some Synthetic Rubbers—I	L. B. SEBRELL and R. P. DINSMORE 37
Application of A. C. Motors to Mixing Mills	R. L. SCOTT and G. E. BROWN 41
New Electron Microscope Used by American Cyanamid	42
Rubber in the Automotive Industry	GEO. W. LAMPMAN and C. F. SMART 43
Synthetic Rubber in the Automotive Industry	J. C. ZEDER 48

INDIA RUBBER WORLD assumes no responsibility for the statements and opinions advanced by contributors.

S. C. STILLWAGON,
Editor

B. BRITTAINE WILSON,
General Manager

EDWARD V. OSBERG,
Associate Editor

M. L. WULFORST,
Circulation Manager

S. R. HAGUE,
Assistant Editor

Published monthly by Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y. Chairman of Board and Treasurer, Raymond Bill; President and General Manager, Edward Lyman Bill; Vice Presidents, Randolph Brown, B. Brittain Wilson.

Subscription price—United States \$3.00 per year; Mexico \$3.50; all other countries \$4.00. Single copies thirty-five cents. Other Bill publications are *Premium Practice*, *Rug Profits*, *Sales Management*, *Soda Fountain*, *Grocer-Graphic*, and *Tires*.

Copyright, March 1, 1941
Bill Brothers Publishing Corp.



Triangular Acceleration

ZIMATE

(OR TUADS IF YOU PREFER)

CAPTAX **ALTAX**

CAPTAX—ALTAX—ZIMATE

provides an accelerator combination
adaptable to wide application. The possi-
bilities of this combination enable com-
pounders to specify stocks economically suited to a
wide variety of factory conditions and requirements.

SEE VOL. 8, No. 5—THE VANDERBILT NEWS

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York City



INDIA RUBBER WORLD

Published at 420 Lexington Avenue, New York, N. Y.

Volume 103

New York, March 1, 1941

Number 6

Pipe Test for Rupture Resistance of Pneumatic Tires

Arthur H. Nellen¹

THE ability of pneumatic tires to resist impact breaks or bruises is one of the most important factors to be considered when evaluating their quality. Various types of tests have been used for measuring this important property, but to our knowledge all of them require that the tire be mounted on a rim and inflated to proper air pressure with an inner tube. This is a laborious procedure, particularly on large truck tires, since the casing must often be dismounted, tube repaired, then remounted in order to obtain check results on the same tire.

The Lee pipe test was developed in the Testing Department of the Lee Tire & Rubber Co. as a quick, accurate and simple method of determining impact resistance on tires, and at the same time to permit the testing of laboratory prepared slabs of tire constructions without the trouble and expense of building a full tire. This latter point is a very important one in developing special cord constructions and experimental tire carcass constructions, or evaluating small samples of special materials for resistance to impact breaks.

In performing this test at Lee a Baldwin Southwark tester of 60,000-pound capacity is used. This is rigged up, as shown in Figure 1, with a cylindrical steel plunger of 1 1/4 inches diameter and having a hemispherical end. The opening between the lower table and the plunger is adjustable so that it is possible to test an inflated tire according to Federal Specification ZZ-T-381C, but in place of a tire, a pipe is placed in concentric position under the plunger, and over this is placed the section of tire to be tested. The table is then raised at the rate of one inch per minute (Figure 2) until failure occurs, when the energy reading in pounds is read on the dial. In Figure 3, characteristic carcass breaks are shown.

For tires of 4- and 6-ply construction, a three-inch inside diameter pipe is used, for 8-ply, 3 1/2-inch, and for 10-, 12-, and 14-ply, a 4-inch pipe. The different diameter pipes are used in order to obtain energy readings of

the same order as are obtained on an inflated tire. In the following tabulation, energy readings are shown on six 10-ply tires, first, inflated and tested on a rim, and then cut sections were tested on a 4-inch pipe.

Tire	Avg. Energy on Inflated Tire	Avg. Energy on 4" Pipe	% Deviation
1	4095	3975	-2.93
2	4451	4205	-5.52
3	4292	4233	-1.39
4	4048	3940	-2.67
5	3090	3038	-1.68
6	3903	3908	0
			-2.43 avg.

Similarly close correlation was obtained on the other

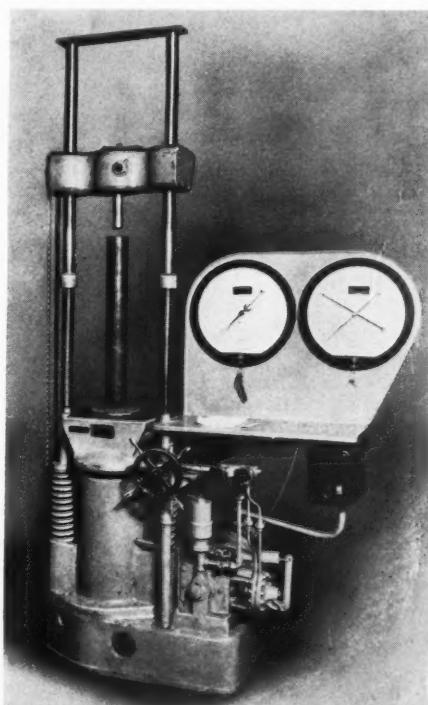


Fig. 1. Baldwin Southwark Tester Rigged for the Pipe Test

¹ Manager, Development Dept., Lee Tire & Rubber Co., Conshohocken, Pa.

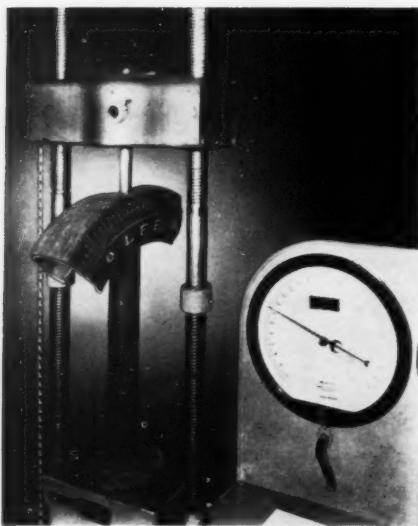


Fig. 2. Tire Segment in Position during Test

sizes with 3- and 3½-inch pipes. We have found that pipe breaks on the same section give better checks than similar



Fig. 3. Carcass Ruptures Characteristic of the Pipe Test

breaks on inflated tires, and we prefer the pipe test for this reason. Also it has been found that laboratory test slab results may be used to predict accurately the actual impact resistance of tires made up of similar materials and constructions.

Neoprene Type KN

NEOPRENE TYPE KN, recently introduced by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., is said to produce vulcanizates with properties essentially the same as those of similarly compounded stocks made from Type G or GN. However Type KN differs from other types in that it can be plasticized to a much greater extent by the use of chemical plasticizers. The new neoprene is said to offer possibilities in the manufacture of specialty products and is of particular interest in the following types of compositions: (1) heavily loaded compounds; (2) base compounds for cements; (3) compounds containing other types of neoprene; and (4) compounds to be cast in special molds.

As with Type GN, the recommended plasticizers are Latac (hexamethylene ammonium hexamethylene-dithiocarbamate) and DOTG (di-ortho-tolylguanidine). The maximum effect is obtained with 1% Latac or 4% DOTG, and Latac is preferred because of imparting room temperature stability and a rapid accelerating effect at vulcanizing temperatures. At 80° C., untreated Type KN has a Williams plasticity of 86 and untreated GN, 245; with 1% Latac, KN has a plasticity of 12, and GN, 81.

When vulcanized, the following highly loaded compound had a Shore durometer of 100 on the "A" type instrument: Neoprene Type KN, 100; Latac, 2; extra light calcined magnesia, 8; soft carbon black, 250; Neozone A, 2; medium process oil, 10; paraffin, 2; and zinc oxide, 20. The unvulcanized compound was sufficiently plastic to flow easily in a curing mold. This compound illustrates the wetting properties of plasticized KN and shows that plasticization does not lower the hardness of the vulcanizate.

Lightly loaded Neoprene Type KN compounds dissolved in common neoprene solvents (toluene, benzene, xylene, etc.) produce cements having a much lower viscosity than similarly compounded cements made from any other type of neoprene. Obviously, one dip or brush coat

of a cement made from KN will deposit a heavier film than will a cement of the same viscosity made from another type of neoprene. Frequently in the lining of tanks and the covering of metal and other surfaces, a heavier coating than can be economically applied by the use of brushing cements is desired. This can be achieved by troweling if the solids content of the cement is increased to form a more viscous compound.

When very tacky or extremely plastic unvulcanized compounds are needed, KN may be used as the sole basic material in lightly loaded compositions. However the wide range of plasticity obtainable with mixtures of KN and other neoprene polymers are of interest in the formulation of friction stocks, roll coverings, lathe cut goods, shoe stocks, and other compounds requiring building tack.

The substitution of KN for other types of neoprene in certain soft type compounds results in an unvulcanized consistency approaching that of a troweling compound. This consistency makes it possible to pour the compounds at elevated temperatures, and the lack of volatile solvents eliminates excessive shrinkage. However such pourable compounds are softer and will display a higher shrinkage than millable compounds, and mold sizes must be established by experimentation. Thus it is possible to shape objects by casting methods, unsuitable for use with normal neoprene compounds; for example, soft roll coverings can be applied to shafts by casting in a cylinder, or irregular shaped objects can be vulcanized in plaster of Paris, wood, or soft metal molds.

Casting compositions, pourable at 80° to 90° C. can be prepared, but special procedures are needed in mixing and casting for the removal of entrapped air. Vulcanization is carried out for long periods at low temperature. By modifying the procedure, rubber molds may be used.

Casting compounds which are not extremely tacky and many KN compounds whose unvulcanized plasticity is not suitable for pouring can be kneaded into mold cavities by hand. This method is particularly applicable to the molding of intricately shaped products, and permits the use of split molds made from materials other than steel.

Facts about the U. S. Rubber Industries

ESTABLISHMENTS engaged in rubber manufactures in the United States in 1939 numbered 595, compared with 478 in 1937, according to the Bureau of the Census. The value of their products was \$902,328,802, compared with the 1937 figure of \$883,032,546.

Four preliminary reports of the 1939 Census of Manufactures relating to the rubber industries have been issued by the Census Bureau, and published in **INDIA RUBBER WORLD**. These reports cover 13 establishments engaged in the manufacture of rubber boots and shoes,¹ 53 in rubber tires and inner tubes,¹ 519 in miscellaneous rubber products,² and 10 in reclaimed rubber.¹

The largest of the four major rubber manufacturing groups in terms of value of products is the tire industry with a production in 1939 valued at \$580,928,933. Next is the miscellaneous products group with a \$264,525,200 output. Third in the list is the rubber boots and shoes industry with \$49,980,591; while the reclaimed rubber industry reported production at \$6,894,018.

The value of rubber tires and inner tubes produced in that industry group was \$497,636,438, and the value of other products not classified in the rubber tire industry, including miscellaneous rubber products, was \$83,292,555. The value of rubber boots and shoes manufactured in 1939 by the rubber boots and shoes industry was \$40,446,140, and other products not classified in the industry were valued at \$9,534,451. The total value of miscellaneous rubber products manufactured in 1939 was \$341,613,427,³ the sum of the value of miscellaneous rubber products produced in factories devoted chiefly to their manufacture and of the miscellaneous products manufac-

tured in the other rubber industries as by-products of their main operations.

The following tables give a breakdown of the data compiled, for the rubber industry as a whole.

TABLE 1. SUMMARY FOR RUBBER INDUSTRIES: 1939-1937

	1939	1937
Number of establishments.....	595	478
Salaried personnel*	18,636	20,147
Salaries†	\$45,419,663	\$45,022,086
Wage earners (average for year)‡	120,715	129,818
Wages‡	\$161,409,811	\$171,304,546
Cost of materials, etc.†	\$495,904,375	\$514,260,412
Value of products§	\$902,328,802	\$883,032,546
Value added by manufacture|| .....	\$406,424,427	\$368,772,134

* No data for employees of central administrative offices included.

† Profits or losses cannot be calculated from Census figures because no data are collected for certain expense items, such as interest, rent, depreciation, taxes, insurance, and advertising.

‡ The item for wage earners is an average of the number reported for the several months of the year and includes both full-time and part-time workers. The quotient obtained by dividing the amount of wages by the average number of wage earners should not, therefore, be accepted as representing the average wage received by full-time wage earners.

§ Value of products less cost of materials, supplies, fuel, purchased electric energy, and contract work.

Crude and Reclaimed Rubber Consumed

This report, released January 24, 1941, by Director William Lane Austin, of the Bureau of the Census, Department of Commerce, gives statistics on crude and reclaimed rubber consumed by establishments classified in the rubber industries for the years 1939 and 1937. These statistics do not include rubber consumed by establishments classified in other industries, such as the wire, electrical, textile, etc., industries for which no data were collected.

Table 4 gives statistics on crude and reclaimed rubber consumed by industries and by classes of products made. Table 5 gives statistics on crude and reclaimed rubber consumed by states. All figures for 1939 are preliminary and subject to revision.

TABLE 2

Kind of Manufactures	Cost of Materials, Etc., in Rubber Industries*		Value Added by Manufacture in Rubber Industries†		Value of Products of Rubber Industries‡	
	1939	1937	1939	1937	1939	1937
Rubber boots and shoes.....	\$20,749,368	\$27,474,556	\$29,231,223	\$36,980,776	\$49,980,591	\$64,455,332
Rubber tires and inner tubes.....	349,286,866	366,858,443	231,642,127	209,001,819	580,928,993	575,860,262
Rubber products, miscellaneous.....	122,875,735	115,755,036	141,649,465	119,018,982	264,525,200	234,774,018
Reclaimed rubber	2,992,406	4,172,377	3,901,612	3,770,557	6,894,018	7,942,934
Total	\$495,904,375	\$514,260,412	\$406,424,427	\$368,772,134	\$902,328,802	\$883,032,546

*Items in this heading are materials, supplies, fuel, purchased electric energy, and contract work.

†Value of products less cost of materials, supplies, fuel, purchased electric energy, and contract work.

‡Value of products at the factory as reported by the manufacturers. The totals for value of products in each of the four groups listed by principal kind of manufacture combine the value of those principal products which are classified in each major industry and of miscellaneous products produced by them, but classified in one or more of the other major rubber manufacturing categories. Value added by manufacture is arrived at by subtracting from the value of products the cost of materials, supplies, fuel, purchased electric energy, and contract work. Profits or losses cannot be calculated from the Census figures because no data are collected for certain expense items, such as interest, rent, depreciation, taxes, insurance, and advertising.

TABLE 3

Kind of Manufactures	Number of Wage Earners in Rubber Industries*		Number of Salaried Personnel in Rubber Industries†		Wages and Salaries in Rubber Industries‡	
	1939	1937	1939	1937	1939	1937
Rubber boots and shoes.....	14,861	18,356	2,101	2,375	\$20,280,727	\$24,645,294
Rubber tires and inner tubes.....	54,115	63,290	9,016	10,952	113,024,271	122,030,710
Rubber products, miscellaneous.....	50,667	46,914	7,407	6,677	71,661,233	67,337,790
Reclaimed rubber	1,072	1,258	112	143	1,863,243	2,312,838
Total	120,715	129,818	18,636	20,147	\$206,829,474	\$216,326,632

*Figures for 1939 represent average number of workers for the year classed as manufacturing employees, not including those engaged in distribution, construction, and other non-manufacturing work; for 1937 all wage earners are included.

†No data for employees of central administrative offices are included.

‡Salaries of central office employees not included. Wages (for 1939) include only those paid to wage earners actually employed in manufacturing. Wage totals for 1937 include wage earners engaged in distribution, construction and other non-manufacturing work.

TABLE 4. RUBBER CONSUMED BY ESTABLISHMENTS CLASSIFIED IN THE RUBBER INDUSTRIES, BY KIND, QUANTITY, AND COST: 1939 AND 1937
(Not including consumption in the wire, electrical, textile, or other industries)

	(Ton, 2,240 Pounds)	
	1939	1937
Crude and reclaimed rubber consumed, by industries:		
Total tons consumed:	714,627	687,176
Purchased:		
Tons	665,600	631,600
Cost	\$214,770,592	\$231,517,943
Reclaimed and consumed by same establishment, tons	49,027	55,576
Crude rubber consumed:		
Total tons	563,710	531,091
Cost	\$201,866,370	\$219,606,315
Rubber Tires and Inner Tubes Industry:		
Tons	442,668	423,999
Cost	\$157,640,126	\$174,188,060
Rubber Boots and Shoes Industry:		
Tons	19,133	22,213
Cost	\$7,102,709	\$9,334,062
Rubber Goods Other Than Tires, Inner Tubes, and Boots and Shoes Industry:		
Tons	101,909	84,879
Cost	\$37,123,535	\$36,084,193
Reclaimed rubber consumed, total tons:	150,917	156,085
Purchased:		
Total tons	101,890	100,509
Cost	\$12,904,222	\$11,911,628
Rubber Tires and Inner Tubes Industry:		
Tons	45,979	44,824
Cost	\$5,784,041	\$5,129,360
Rubber Boots and Shoes Industry:		
Tons	2,202	2,779
Cost	\$262,352	\$320,722
Rubber Goods Other Than Tires, Inner Tubes, and Boots and Shoes Industry:		
Tons	53,709	52,906
Cost	\$6,857,829	\$6,461,546
Reclaimed and consumed by same establishments, total tons:	49,027	55,576
Rubber Tires and Inner Tubes Industry, tons	25,498	37,372
Rubber Boots and Shoes, and Rubber Goods Other Than Tires and Inner Tubes	23,529	18,204
CRUDE RUBBER CONSUMED, BY CLASS OF PRODUCTS MADE		
	Tons	
Rubber tire and inner tubes:		
Pneumatic casings	357,221	333,867
Inner tubes	51,731	51,450
Solid and cushion	1,570	1,653
Boots and shoes	15,970	20,214
Rubber heels and soles, including slab soling	22,642	13,176
Rubberized fabrics and rubberized clothing (finished)*	9,291	10,524
Mechanical rubber goods, rubber flooring, rubber mats and matting	47,472	56,422
Hard rubber goods	3,328	3,660
Rubber thread, rubber cement, and rubber gloves	9,296	9,514
Tires, sundries, and repair materials, rebuilt or retreaded tires, including camelback	16,973	11,115
Other manufactures of rubber, including druggists' and medical sundries, balloons, stationers' rubber bands, erasers, golf and tennis balls, toys, and sponge rubber products	28,216	19,496†

*Includes bathing caps and bathing suits.

†Revised.

TABLE 6. GENERAL STATISTICS FOR GROUPS OF ESTABLISHMENTS IN THE "RUBBER PRODUCTS NOT ELSEWHERE CLASSIFIED" INDUSTRY AND IN THE "RECLAIMED RUBBER" INDUSTRY, FOR 1939

	Number of Establishments	Number of clerks	Clerks' Salaries	Wage Earners (Average for the Year)	Wages	Cost of Materials, Supplies, Fuel, Purchased Energy, and Contract Work	Value of Products	Value Added by Manufacture
Rubber Products Not Elsewhere Classified industry, total	519	3,854	\$4,825,088	50,692	\$53,357,735	\$122,875,377	\$264,525,200	\$141,649,823
Rubber heels and soles	30	352	362,215	6,875	6,123,199	15,209,212	32,004,422	16,795,210
Mechanical rubber goods	173	2,468	\$1,179,599	27,690	31,593,174	64,794,815	145,505,808	80,710,993
Rubber toy balloons, toys, balls	22	118	99,758	2,476	2,185,475	3,322,895	8,414,481	5,091,586
Rubber tire repair materials	48	104	120,380	1,063	903,511	3,682,423	7,329,825	3,647,402
Druggist, household, and stationers' rubber supplies	63	245	298,240	4,759	4,627,107	6,239,406	17,547,587	11,308,181
Rubber cement, fabrics, strips, etc.	172	552	744,832	7,389	7,575,367	28,750,708	52,135,719	23,385,011
Unclassified	11	15	20,064	440	349,902	875,918	1,587,358	711,440
Reclaimed Rubber industry	10	40	45,791	1,072	1,477,036	2,992,406	6,894,018	3,901,612

Table 6, shown above, released February 5 by Director Austin, from preliminary statistics compiled from results of the Census of Manufactures for 1939, gives general statistics for seven groups of establishments in the Rubber Products Not Elsewhere Classified industry and for the Reclaimed Rubber industry. The figures are preliminary and subject to revision.

Cotton Tire Fabric Statistics

Cotton tire fabrics produced in American cotton mills

TABLE 5. RUBBER CONSUMED BY ESTABLISHMENTS CLASSIFIED IN THE RUBBER INDUSTRIES BY STATES: 1939 AND 1937
(Not including consumption in the wire, electrical, textile, or other industries)

	(Ton, 2,240 Pounds)		Reclaimed Rubber* (Tons)
	Crude Rubber (Tons)	Purchased and Consumed	Reclaimed and Consumed in Same Establishment
United States:			
1939	563,710	101,890	49,027
1937	531,091	100,509	55,576
California:			
1939	47,494	8,275	*
1937	59,322	8,275	*
Connecticut:			
1939	18,828	1,774	†
1937	15,655	1,771	*
Illinois:			
1939	6,311	2,171	*
1937	6,516	2,171	*
Indiana:			
1939	16,754	5,471	*
1937	16,754	5,471	*
Maryland:			
1939	*	3,018	*
1937	*	3,018	*
Massachusetts:			
1939	42,417	7,083	9,436
1937	36,166	7,161	8,612
Michigan:			
1939	85,848	19,834	†
1937	*	*	*
Missouri:			
1939	9,552	*	†
1937	*	*	*
New Jersey:			
1939	14,021	7,838	2,876
1937	16,200	8,326	*
New York:			
1939	22,506	3,451	*
1937	13,766	3,451	*
Ohio:			
1939	189,833	26,933	20,572
1937	220,186	32,950	28,892
Pennsylvania:			
1939	24,824	4,396	*
1937	18,693	4,351	*
Rhode Island:			
1939	7,453	*	†
1937	5,699	*	*
Other States:			
1939	77,867†	11,646	16,143
1937	138,888	46,550	18,072

*Withheld to avoid disclosing, exactly or approximately, consumption reported by individual establishments; included in figure for "Other States."

†None reported.

‡Alabama, Colorado, Delaware, Georgia, Iowa, Kentucky, Maine, Maryland, Minnesota, Mississippi, Nebraska, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Vermont, Virginia, Washington, Wisconsin.

in the last 20 years have amounted, in terms of weight, to the equivalent of over six million 500-pound bales of cotton, according to records of the Bureau of the Census

based on biennial reports since 1919 in the Census of Manufactures. This total is based on the annual average calculated for those years in which the Census of Manufactures was held and applied to the intercensal years. The annual average production of tire fabrics for all Census years in the two decades was 160 million pounds.

The average annual reported factory value of tire fabrics during the two decades was approximately 80 million dollars, or over a billion and one-half dollars for the 20-year period.

Production of tire fabrics, as reported biennially, in
(Continued on page 49)

Properties of Some Synthetic Rubbers—I¹

HIGHLY polymerized rubber-like materials have been divided by Stocklein² into two general classes: (1) synthetics capable of vulcanization—(a) butadiene copolymers and (b) reaction products of dihalogenated aliphatic compounds with sodium polysulphide; (2) synthetics incapable of vulcanization—(a) polymerized isobutylenes (similar to Vistanex) and polymerized acrylic acid esters (similar to Plexigum and like materials) and (b) products having rubber-like properties in combination with certain plasticizing agents (for example, Koroseal).

In the present paper, discussion will be limited to those types of synthetic rubber falling in the first group above and will deal with: (1) structure as revealed by X-Ray analysis; (2) general characteristics as indicated by the physical properties in the usual type of tire tread compound and a mechanical goods compound; and (3) a new dynamic test for evaluating synthetic rubbers in comparison with natural rubber and results obtained by this test which represent the type of information desired by an engineer when designing an engine mounting or spring suspension of these synthetic rubbers.

X-Ray Structure of Synthetic Rubber

In presenting a series of X-ray diagrams for the various types of synthetic rubber in comparison with natural rubber, in both the stretched and the unstretched condition, it is our purpose to bring out the fact that the molecular structure of the synthetic rubbers is entirely different from that of natural rubber. It is also proposed to review briefly the theories which have been advanced, based on the X-ray analysis of rubber, to account for the elasticity of natural rubber and to advance the possible reason for the variation shown by the X-ray diagrams of synthetic rubber.

At the present time, from the most general point of view, the molecular structure of a rubber-like material is envisaged as a sort of brush-heap structure of entangled long chain molecules.⁴ X-ray diffraction patterns show that for some rubber-like materials, notable regularities of structure sometimes occur in the tangle of long-chain

L. B. Sebrell² and R. P. Dinsmore²

molecules. It is now realized that these regularities are not essential for rubber-like behavior. Nevertheless their observation and study is important because they afford a unique opportunity for studying the molecular structure of the chains and the molecular rearrangements which occur upon the application of stress.

Under ordinary circumstances the X-ray diffraction pattern for natural rubber consists of a broad halo similar to that obtained for liquids. This halo is shown in Fig. 1. Upon stretching, sharp diffraction spots appear, as shown in Figure 2. This phenomenon was first observed by J. R. Katz.⁵ Since then it has been the subject of many investigations. For further details and the present status of the work, a review article may be consulted.⁶

A pattern such as that shown in Figure 2 indicates the presence of small, ordered crystalline regions. The crystallites are aligned in the direction of the stretching. The explanation of the appearance of these crystalline regions is somewhat involved in conjecture. What happens, apparently, is that under the action of the applied stress, relatively short lengths of adjacent long-chain molecules are straightened and approximately aligned and positioned with respect to each other. As a result of these favorable circumstances, a spontaneous crystallization can then occur due to intermolecular forces which are sufficiently strong and regular to result in a crystal lattice. A single long-chain molecule is thought of as traversing a number of the ordered regions or crystallites.⁷

The alignment of the crystallites in the direction of stretching is somewhat analogous to the changes in structure which occur upon the cold working of metals.⁸ One

¹ Abstracted from a paper presented at the annual meeting of the Society of Automotive Engineers at the Book-Cadillac Hotel, Detroit, Mich., Jan. 6 to 10, 1941.

² Goodyear Tire & Rubber Co., Akron, O.

³ *Trans. Inst. Rubber Ind.*, June, 1939, p. 51.

⁴ R. Houwink, "Elasticity, Plasticity and Structure of Matter," Cambridge Press, 1937, p. 205.

⁵ *Naturwissenschaften*, 13, 410 (1925).

⁶ S. D. Gehman, *Chem. Revs.*, 26, 203 (1940).

⁷ K. H. Meyer, and H. Mark, "Der Aufbau der Hochpolymeren Organischen Naturstoffe," Leipzig, 1930.

⁸ J. T. Norton, "A.S.T.M. Symposium on Radiography and X-Ray Diffraction," Philadelphia, 1937, p. 302.

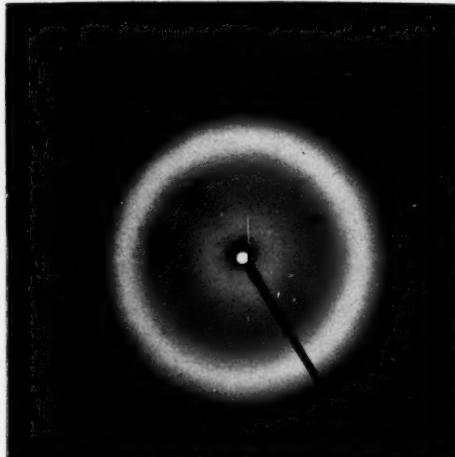


Fig. 1. Rubber Unstretched

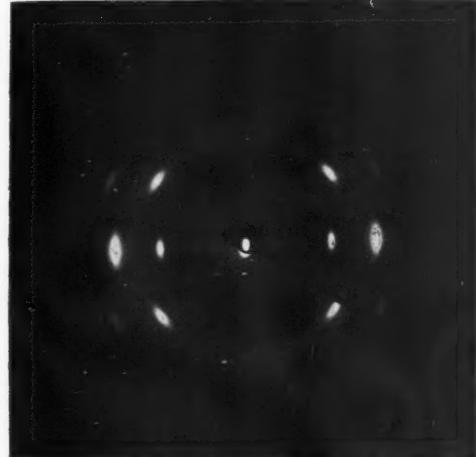


Fig. 2. Rubber Stretched

of the fundamental differences lies in the fact that crystal grains exist in the metal before the working and are brought into alignment by the working. In the case of rubber, the crystallites are not only aligned, but are brought into existence by the stretching. The formation of the crystallites in stretched rubber is responsible for some characteristic properties of rubber which are analogous to strain hardening of metals. Thus, stiffening occurs at the higher elongations, and the stress-strain curve is concave toward the stress axis. There is a reduction in creep or plastic flow at higher elongations. It is possible to stretch rubber so slowly that crystallites are not formed. Under such circumstances the tensile strength is greatly reduced.⁹

The molecularly ordered state brought about by the stretching of rubber is unstable when the stress is released. Thermal agitation then quickly results in a dissolution of the crystallites and a return of the molecules to the more probable random arrangement. This is accompanied by a rapid retraction and the return of the amorphous, relatively unordered structure.¹⁰

For rubber-like materials which do not form crystallites

⁹ H. Hintenberger and W. Neumann, *Kautschuk*, 14, 77 (1938).

¹⁰ H. Mark, *Chem. Revs.*, 25, 121 (1939).

¹¹ J. E. Field, *J. Applied Phys.*, Jan., 1941, pp. 23-34.

¹² *Naturwissenschaften*, 26, 12 (1938).

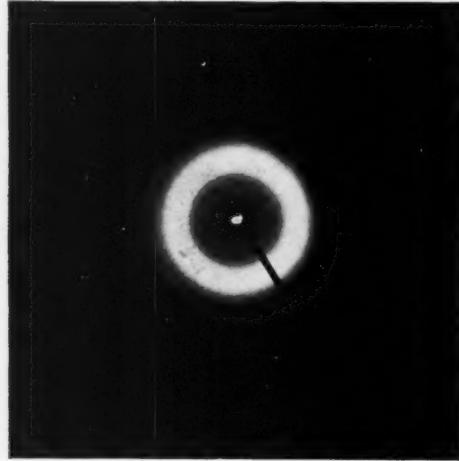


Fig. 3. Vistanex Unstretched

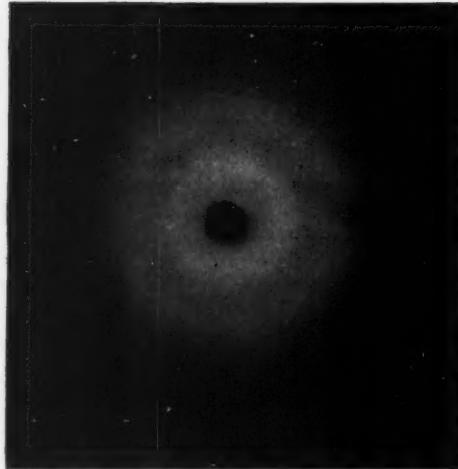


Fig. 5. Neoprene Unstretched

upon stretching, we can be reasonably certain that a similar straightening and alignment of long-chain molecules occurs upon stretching, with consequences similar to those in the case of natural rubber, although an actual crystal lattice is not formed. There must be some aspect to a rubber-like structure which prevents excessive slipping of the long-chain molecules upon the application of stress. Otherwise deformation would be of a plastic nature. This necessary rigidity can be introduced into the structure in a number of ways. The formation of crystallites, offering points of anchorage for the long-chain molecules, is only one possibility. Primary valence cross-linkages between the long-chain molecules appear to be the effective means in the case of many synthetic rubbers. In the case of vulcanized rubber both mechanisms occur, and the relative effects of crystallite formation and cross-linkage in affecting the properties of vulcanized rubber is an interesting subject for experimental investigation.¹¹ In still other cases the secondary valence forces between the long-chain molecules may hinder plastic flow to a sufficient extent to give rise to high elasticity.

The formation of crystallites upon stretching does occur in the case of several synthetic rubbers, proving that this characteristic is not necessarily related to the botanical origin of natural rubber. Patterns for unstretched and

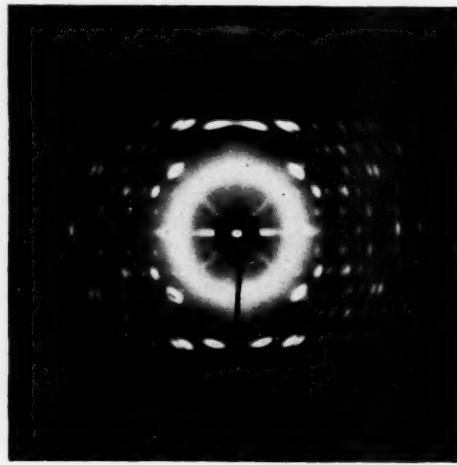


Fig. 4. Vistanex Stretched



Fig. 6. Neoprene Stretched

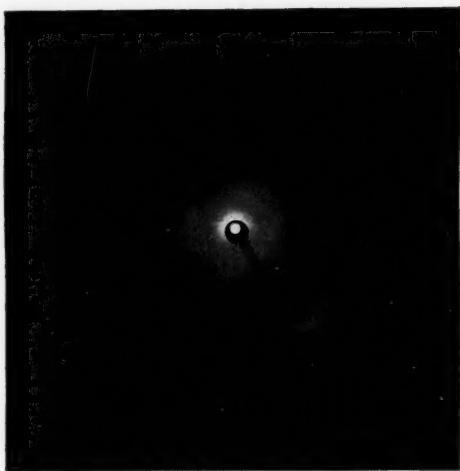


Fig. 7. "Thiokol" Unstretched

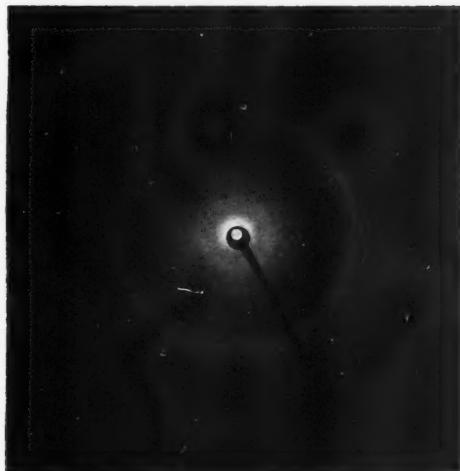


Fig. 8. "Thiokol" Stretched

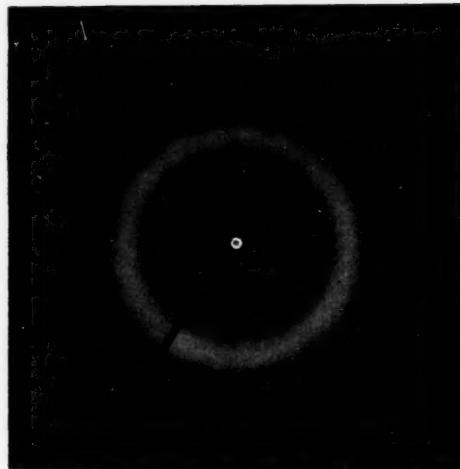


Fig. 9. Buna S Unstretched

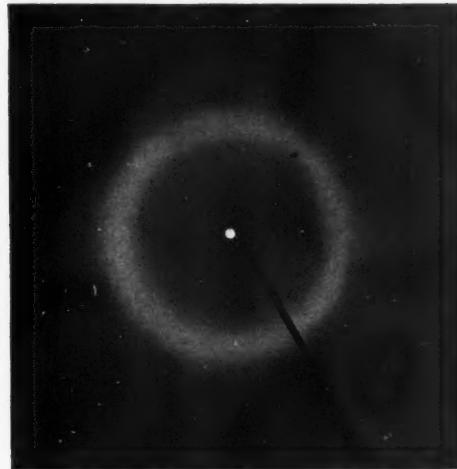


Fig. 10. Buna S Stretched

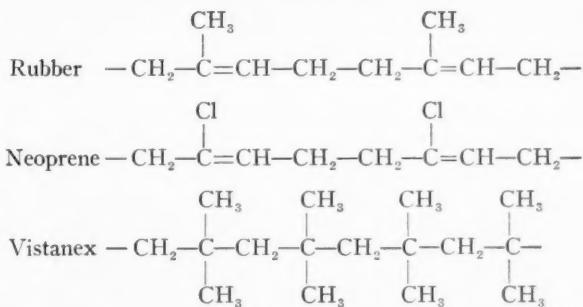
stretched Vistanex are shown in Figures 3 and 4. Such patterns were first reported by R. Brill and F. Halle.¹² The difference in structure indicated by the patterns is truly remarkable. Neoprene was the first synthetic rubber to exhibit crystallinity upon stretching.¹³ The degree of crystallinity, as judged by the sharpness and intensity of the X-ray diffraction spots, appears to be less than in the case of natural rubber or Vistanex. Figures 5 and 6 are patterns for unstretched and stretched neoprene, respectively. Some varieties of "Thiokol" give crystalline fiber diagrams upon stretching.^{14,15} In Figures 7 and 8 are shown the patterns for a commercial, vulcanized "Thiokol" stock unstretched and stretched. Here the halo is possibly sharp enough to indicate some rudimentary crystallization. But there is no evidence of orientation.

The formation of crystallites upon stretching, such as occurs for stretched rubber, Vistanex, and neoprene, is, apparently, possible only when a uniform chemical structure exists in the long-chain molecules and when there are few, if any, primary valence cross-linkages between the chains. The chemical formulas usually ascribed to these chain molecules are indicated as follows:

¹² W. H. Carothers, I. Williams, A. M. Collins, and J. E. Kirby, *J. Am. Chem. Soc.*, 53, 4203 (1931).

¹⁴ J. R. Katz, *Trans. Faraday Soc.*, 32, 77 (1936).

¹⁵ C. S. Fuller, *Chem. Revs.*, 26, 160 (1940).



The crystallization which occurs upon stretching is evidence for the orderly arrangement of the methyl groups and chlorine atoms along the chains.

In the case of the polymerization of butadiene, amorphous products have always been reported.¹⁴ As confirmed by the insolubility of the products, what evidently happens here is an extensive cross-linking of the chains. That is, instead of securing long chains (similar to those for rubber, but with the methyl groups replaced by hydrogen atoms), polymerization will proceed only until a chain of limited length is formed, and then a cross-linkage to

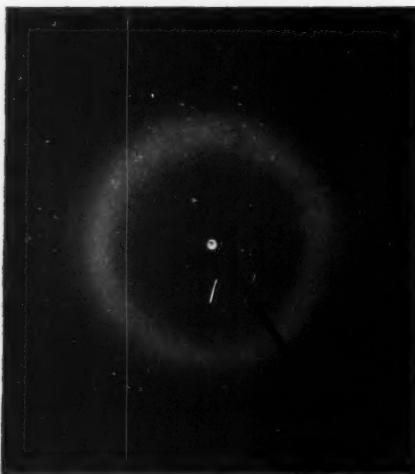


Fig. 11. Buna N Unstretched

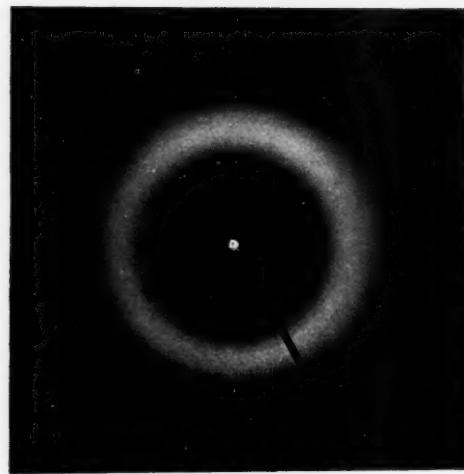


Fig. 12. Buna N Stretched



Fig. 13. Chemigum Unstretched

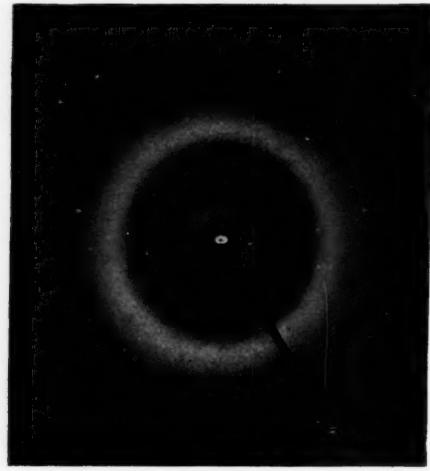


Fig. 14. Chemigum Stretched

a neighboring chain will occur at one of the double bonds. The uncontrolled character of these primary valence cross-linkages between the long chain molecules is presumably responsible for so much irregularity in structure that the formation of a crystal lattice upon stretching is not possible. A number of synthetic rubbers are products of the copolymerization of butadiene and some other monomer or monomers. In such cases, it is most likely that, in addition to cross-linking, the monomers enter the chains in a random fashion so that the possibility of crystallization is entirely precluded.

Patterns for Buna S and Buna N are shown in Figures 9, 10, 11 and 12. The halo persists even at the highest elongation obtainable. In the case of a Buna N tread stock, a splitting of the halo into two arcs was observed at higher elongations. This can be interpreted as being due to a high degree of alignment of the chain molecules in the direction of stretching without the formation of a three dimensional lattice. The X-ray diagram for Chemigum, Figures 13 and 14, indicates the existence of an amorphous structure.

The formation of crystallites upon stretching, such as occurs for natural rubber, is thus not a necessary characteristic for a rubber-like material, as has been previously explained. It occurs only under favorable conditions of

regularity in the long-chain molecules. For the amorphous synthetic rubbers, the information which can be obtained from the X-ray patterns is very much limited. The X-ray diffraction patterns show simply a liquid structure. They do not reveal the molecular basis of their rubber-like elasticity, that is, their capabilities of large extensions and retractions. This is now thought to reside in the straightening and alignment of the long-chain molecules by stretching and the destruction of this relatively ordered arrangement by thermal agitation upon release of the stress. Since the ordered arrangement produced by stress is not perfect enough to result in a crystal lattice, it does not become apparent in the X-ray diffraction patterns. Only where crystallization occurs can the X-ray diffraction patterns be of much use in understanding the structure. A fundamental limitation of the X-ray diffraction method is, even then, that it gives information on the relative geometrical positions of the molecules, but none directly on the magnitude of the molecular forces involved.

From these considerations it is apparent that the structure of the synthetic rubbers is at least entirely different from that of natural rubber and that they may owe their rubber-like properties to the operation of an entirely different mechanism.

(To be concluded)

Application of A. C. Motors to Mixing Mills

R. L. Scott¹ and G. E. Brown²

MODERNIZATION and expansion plans usually require the addition of many motors to those already in operation. In 1928 the Gillette Tire Plant of the United States Rubber Co. in Eau Claire, Wis., started extensive expansions in its factory which have continued yearly up to the present time. In adding motors, many points were considered besides the horsepower and speeds recommended by the machinery manufacturers. Certain safety features were taken into consideration, and emergency devices were incorporated in the control, in accordance with recommendations of the United States Department of Labor Safety Codes. Because since 1928 many power companies have injected power factor adjustment clauses into industrial electric power contracts, synchronous motor applications were considered on all motors of 75 horsepower and larger. As a result of this study, synchronous motor drives were substituted for induction-type motors on all integral installations requiring ratings of 75 horsepower and larger. The resulting improvement in power factor is illustrated graphically in the Vector diagram, Figure 1.

In rubber factories it has been quite customary in the past to drive mixing mill rolls with slip ring induction motors. These mills normally require a speed of 90 r.p.m. Usually this speed has been secured from 585 r.p.m. slip ring motors direct-coupled to reduction gears through magnetic clutches with a solenoid brake on the gear side of the magnetic clutch. The objective of the magnetic clutch and solenoid is primarily for safety trip control which functions when the clutch is de-energized either from the main control or from a safety-trip rod extending on both sides and the full length of the rolls. Incorporated in the main control is a provision for manually

¹ Power engineer, Gillette Tire Plant of United States Rubber Co., Eau Claire, Wis.
² Industrial Division, Westinghouse Electric & Mfg. Co., Minneapolis, Minn.

² Industrial Division, Westinghouse Electric & Mfg. Co., Minneapolis, Minn.

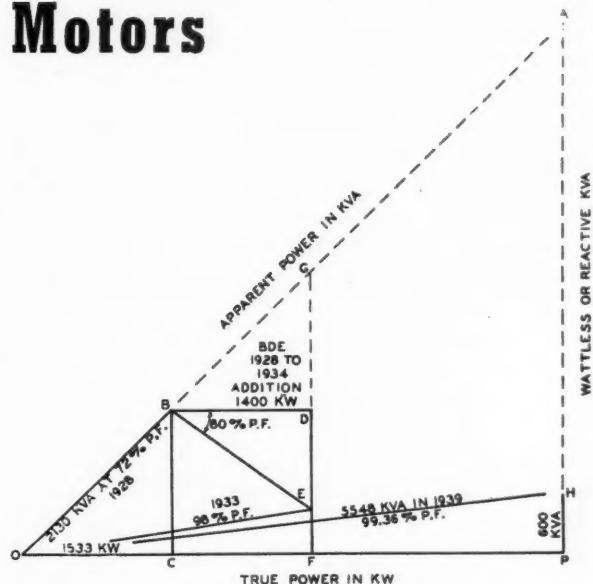


Fig. 1. Vector Diagram Showing Past and Present Electrical Operating Conditions in Gillette Tire Plant

reversing the direction of rotation of the motor so that in case of accident the rolls can be stopped and reversed in the shortest time possible.

One such unit, which consists of three 60-inch mixing mills, is now driven by a 250 horsepower synchronous motor, 80% power factor, 2200 volts, 3-phase, 60 cycles, 720 r.p.m. with the rotor of the motor mounted upon the input shaft of an MR-32 Nuttall reduction gear unit, having an output speed of 90 r.p.m. Separate excitation of the synchronous motors was used in order that dynamic braking might be used most effectively. Typical installations of synchronous motors for heavy duty in the Gillette Tire Plant are shown in Figures 2 and 3.

Such a setup has many advantages. Less linear space was required as the result of eliminating the magnetic

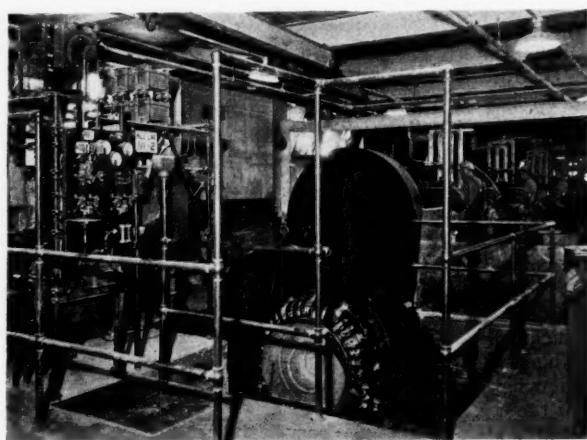


Fig. 2. Three-Mill Line with Rolls at 90 R.P.M., Driven by 250 Horsepower Synchronous Motor, 2200-Volt, 3-Phase, 60-Cycle, 720 R.P.M. with 80% Power Factor and MR-32 Gear Unit with Manual Reversing and Dynamic Braking



Fig. 3. (Front) Synchronous Motor 100 Horsepower, 2200-Volt, 3-Phase, 60-Cycle, 600 R.P.M. with 80% Power Factor Driving 60-in. Mill; (Background) Synchronous Motor 125 Horsepower, 2200-Volt, 3-Phase, 60-Cycle, 600 R.P.M. with 80% Power Factor Driving Rubber Strainer

clutch, solenoid brakes, etc., required in the old method of drive. Safety stopping was obtained more rapidly with dynamic braking. The combined overall efficiency of this type of drive was much better than the previous induction drive. Full voltage starting could also be used with higher starting torques and with starting kva inrushes to the motors not exceeding 450%.

When users of electrical energy attempt to reduce their energy cost, they immediately learn that power factor and load factor are two of the most important items to be considered. The electrical data shown in Table 1 will illustrate what can be accomplished by the proper application and operation of alternating current motors.

TABLE 1. ELECTRICAL DATA FROM GILLETTE TIRE PLANT

Year	Average Cost per Month	Average KW Hours	Average Rate per Month	Actual KW Demand	Average P.F.*	Load Factor
1928	\$6,617.81	682,700	\$0.00979	1533.0	.72	.....
1929	8,350.00	841,000	0.0099	2240.0	.73	.....
1930	8,000.00	690,000	0.0175	2360.0	.75	.....
1931	8,950.00	788,000	0.01135	2736.0	.85	.....
1932	8,950.00	765,000	0.01187	2928.0	.90	.....
1933	7,864.29	760,833	0.01034	2625.0	.98	.....
1934	9,804.71	1,089,334	0.00923	2937.0	.99.31	60.68
1935	9,820.26	1,112,500	0.00882	2840.0	.99.16	65.12
1936	14,485.79	1,822,333	0.00794	3747.0	.99.19	78.31
1937	18,130.99	2,247,583	0.00806	5066.0	.99.70	75.10
1938	16,135.73	1,920,334	0.0084	4753.0	.99.12	69.83
1939	15,069.58	2,828,917	0.00763	5513.3	.99.36	80.18

Year	No. Working Days	Ave. Elec. Cost per Lb. Product	Additional Cost per Year if P.F. Were 72% with Rate of \$1.20 per KVA
1934	....	.....	\$16,395.00
1935	....	.....	\$16,110.00
1936	309	\$0.00265	\$20,529.00
1937	290	0.00309	\$27,372.00
1938	287	0.00300	\$25,661.00
1939	319	0.00280	\$29,966.00

Total savings during last six years..... \$136,033.00

*The percentages for the years 1928-1933 are approximate only.
Note: Power factor penalty feature went into effect in 1934 power company contract.



which the new instrument will be applied are: catalysts, the treatment of textiles, synthetic resins, and rubber chemicals and their action in prolonging the life of rubber goods. The smallest distance that has so far been clearly revealed by the electron microscope is about 30 Angstrom units.

The electron microscope is based on the fact that fast moving electrons possess a wave length far shorter than that of visible light. In the best optical instruments the limit of magnification is about 1,000 to 2,000 times natural size. With ultra-violet light and a microscope provided with quartz lenses, the magnification is about twice that of a microscope using visible light. In the electron microscope the radiation involved is a stream of electrons, the associated wave length of which is of the order of a 100,000 times smaller than that of ultra-violet light. As a result, the limit of useful magnification, which may be increased by future development, is approximately 100,000 to 200,000 actual size. Objects whose dimensions are 1/100 to 1/50 those of the smallest object to be seen with visible light can be pictured.

The electron microscope consists of a straight metal vacuum tube about four feet long with an electron source, three magnetic "lenses", a special air lock for specimen introduction, and a second air lock placing the photographic plate in position. The voltage regulating equipment consists of 52 vacuum tubes with accompanying apparatus for converting standard current to one of 50,000 volts, constant within a single volt. This exact control of voltage is essential to the instrument's operation.

In the electron microscope, a swift stream of electrons is emitted from the hot tungsten filament of the vacuum tube. The electron beam is focused and directed through the tube by means of electromagnets which serve much the same purpose as glass or quartz lenses in the case of ordinary microscopes. The stream of electrons is then directed through a magnetic field to focus the beam on the object to be examined, and as the electrons pass through the thin section of the specimen, variations in thickness or density scatter or absorb parts of the beam. This modified beam is finally focused on a fluorescent viewing screen which glows in proportion to the density of the electron stream striking its surface and thus reveals the magnified image. When photographs are desired, a photographic plate is substituted for the viewing screen. During operation, the tube is continuously pumped to a high vacuum to prevent scattering of the electrons by collisions with molecules of air or other gas.

New Electron Microscope Used by American Cyanamid

AMERICA'S first commercially built electron microscope, which enables magnifications of 100,000 times natural size, is now being operated in the laboratories of the American Cyanamid Co., at Stamford, Conn. Although several experimental microscopes of the kind have been built and used, this first American commercial instrument was developed and built by the RCA Research Laboratories in Camden, N. J.

Results already obtained by American Cyanamid research workers in the study of pigments (precipitated chalk and magnesium oxide) show that infinitely fine particles of these materials possess the same crystalline structure as larger pieces. This disproves the theory widely held heretofore that such pigments lose their crystalline character when precipitated as infinitesimally small particles.

Photographs made directly in the electron microscope show the object magnified 20,000 to 30,000 times. However details are so clearly pictured that they can be readily enlarged to give a total useful magnification of 100,000 times natural size. Individual long-chain molecules of polyvinyl chloride have been pictured with the aid of the electron microscope, and particles of colloidal carbon have been found to be generally spherical in shape and to have a diameter of about 4×10^{-7} inch. Among the fields to

Rubber in the Automotive Industry

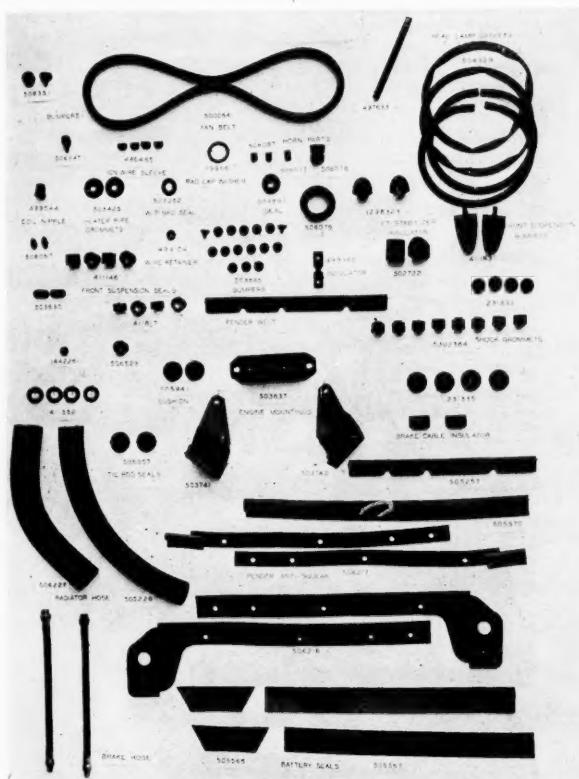
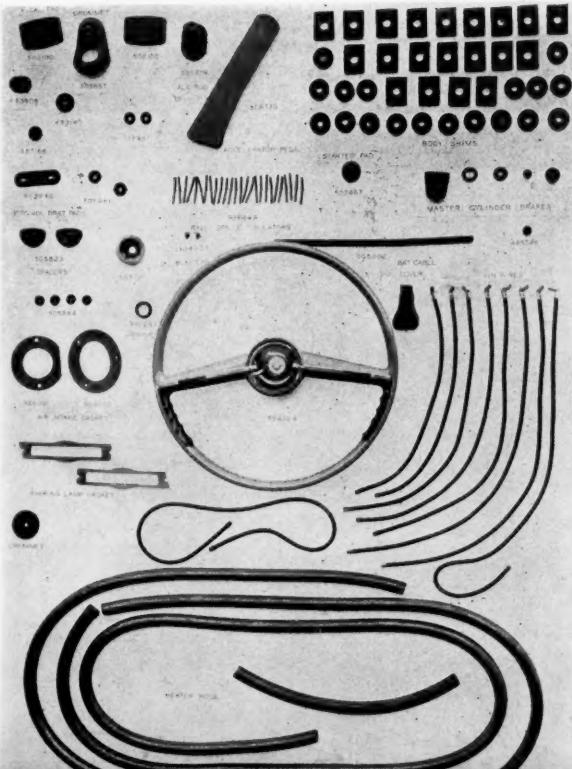


Fig. 1

Some Rubber Parts in a Pontiac Automobile

Fig. 2



From the Viewpoint of the Automotive Engineer

Geo. W. Lampman¹ and C. F. Smart²

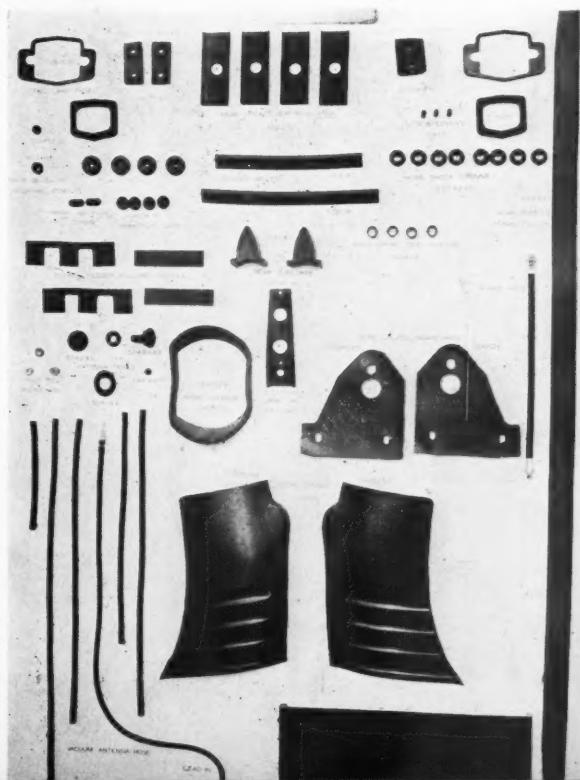
RUBBER compounds are essential to the modern automobile, and rubber technicians, physicists, and chemists are to be commended on the manner in which they have developed rubber products to meet the requirements of motor car service. Undoubtedly there will be further demands for improvement, and we have faith that the technical men of the rubber industry can and will meet them. The immediate need appears to be mostly for wider dissemination of the information already available, in order that automotive engineers and designers may more intelligently work out specifications for the various applications of rubber compounds.

Specifying the rubber compounds for car parts as "soft black non-blooming rubber" or more simply as "rubber compound" has been a result of ignorance on the part of the designer as to the properties of rubber compounds available and required for his needs. This practice may have been good for the compounding and the salesman, but has not been helpful to performance. Automotive engineers are endeavoring to learn more regarding the physical requirements of rubber suitable for the parts they

¹ Paper presented before the Division of Rubber Chemistry on Sept. 12, 1940, at the one hundredth meeting of the A. C. S. held in Detroit, Mich.

² Pontiac Motor Division, General Motors Corp., Pontiac, Mich.

Fig. 3



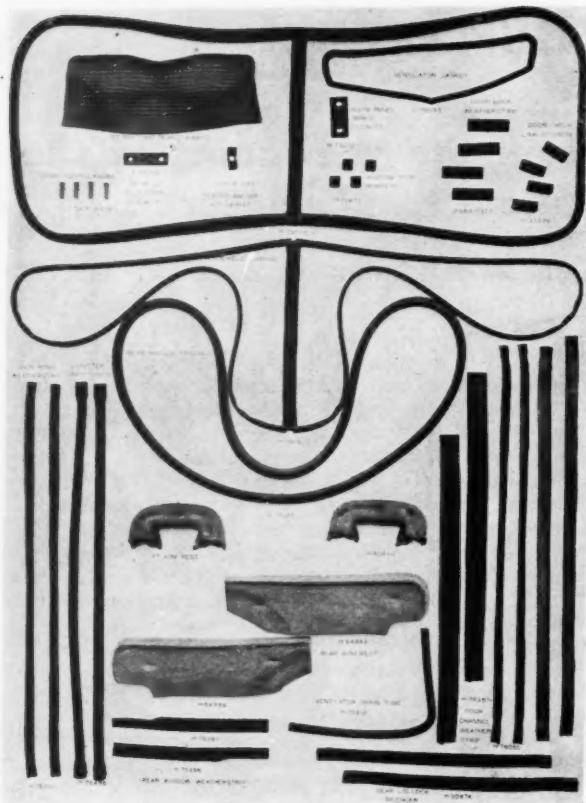


Fig. 4

Some Rubber Parts in a Pontiac Automobile

Fig. 5

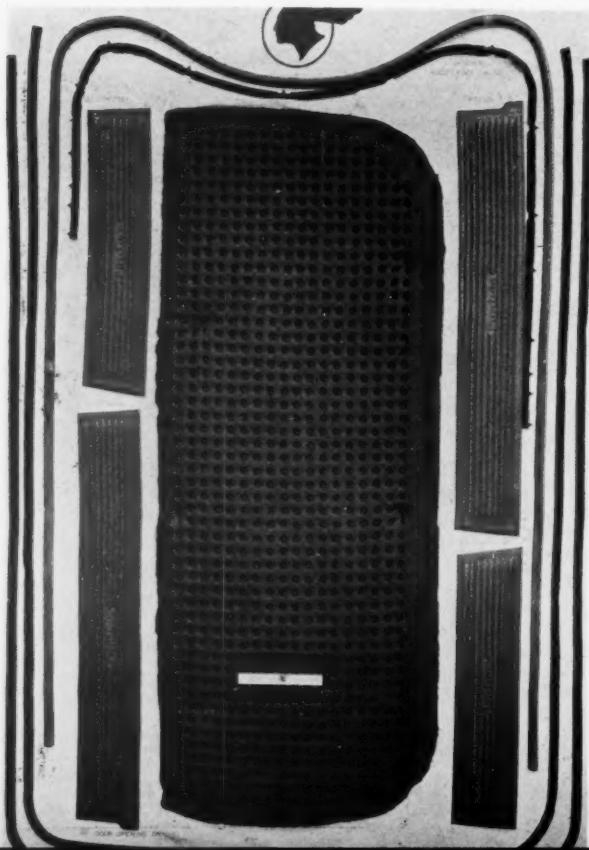
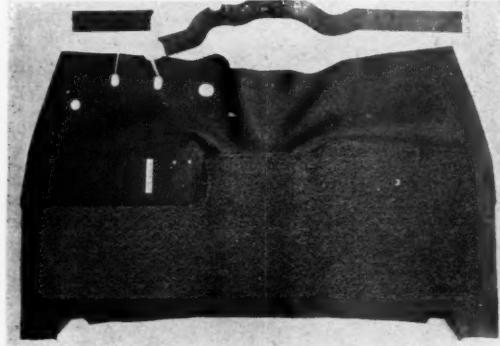


Fig. 6



radiator gaskets that swelled and rotted out; oil resistant washers which were scarcely oil resistant; water seals which did not resist water—these are some of the headaches from rubber parts which have pestered the engineers in their efforts to apply rubber as parts of the automobile. Most prominent on the other side of the ledger is the excellent life of the modern tire.

Our experience has been that the rubber compounder can do an excellent job. The problem from the automotive engineers viewpoint is mostly one of translating compounding technique into specifications which will insure the proper balance of properties, price, and performance.

The use of rubber parts in the automobile and some of the requirements which these parts have to meet are illustrated in Figures 1 to 7 inclusive.

Figure 8. 13 Compounds in water at 210° F. for 110 hours.
 Figure 9. 18 Compounds in water at 210° F. for 110 hours.
 Figure 10. 21 Compounds in water at 210° F. for 280 hours.
 Figure 11. 14 Compounds in 1% solution of soluble oil at 210° F. for 265 hours.
 Figure 12. 21 Compounds in 1% solution of soluble oil at 210° F. for 280 hours.
 Figure 13. 20 Compounds in 2% solution of soluble oil at 210° F. for 275 hours.

These are photographs of panels on which are mounted the rubber parts used to build one automobile. Each of these parts has specific requirements, some simple, some complex, which the rubber compound must meet to make the part suitable, for example—

For a simple grommet the principal requirement is that it be able to withstand the distortions of assembly and remain in place when assembled. On other parts as, for example, a radiator hose the requirements may be more complex.

Figures 8 to 19 inclusive, illustrating specimens from some boiling tests on radiator and heater hose compounds in various radiator solutions, may serve to indicate some of the work required of the automotive engineer in the selection of rubber compounds.

Figure 14. 14 Compounds in 50% solution of alcohol anti-freeze "A" at 183° F. for 265 hours.
 Figure 15. 21 Compounds in 50% solution of alcohol anti-freeze "A" at 180° F. for 280 hours.
 Figure 16. 21 Compounds in 50% solution of alcohol anti-freeze "B" at 180° F. for 280 hours.
 Figure 17. 14 Compounds in 50% solution of alcohol anti-freeze "B" at 183° F. for 265 hours.
 Figure 18. 21 Compounds in 50% solution of alcohol anti-freeze "B" at 182° F. for 280 hours.
 Figure 19. 34 Compounds aged 30 days in sunlight at 10% elongation, but photographed at 50%.

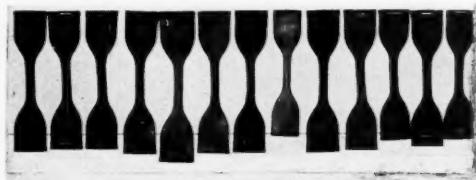


Fig. 8

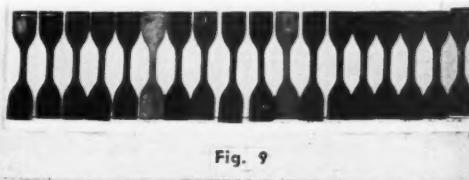


Fig. 9

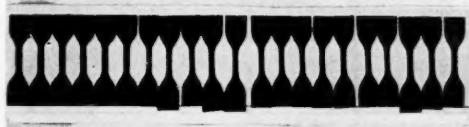


Fig. 10

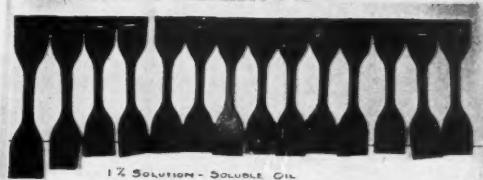


Fig. 11

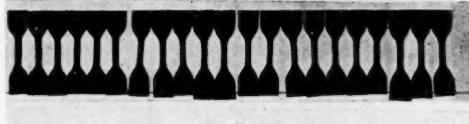


Fig. 12

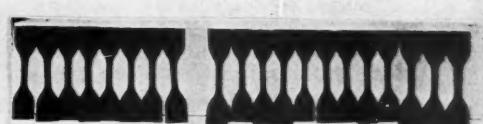


Fig. 13

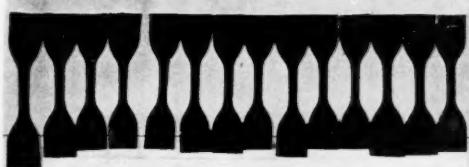


Fig. 14



Fig. 15



Fig. 16

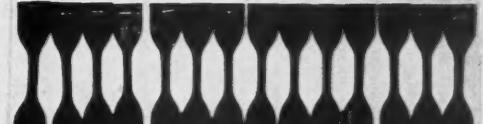


Fig. 17



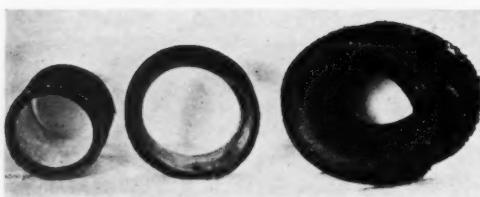


Fig. 20 (Left) Original Section of Radiator Hose, (Center) after Boiling in Alcohol-Type Anti-Freeze, and (Right) Section of Hose after Immersion One Day in a Proposed Anti-Freeze

These illustrations represent $\frac{1}{4}$ -inch A.S.T.M. dumbbells cut from $\frac{1}{10}$ -inch thick sheets of compounds submitted by various suppliers for radiator and heater hose purposes. The original length of the specimen is indicated by the base line near the bottom in each figure. The deviations in length from this line show the amount of linear growth for the treatments as designated.

Figure 20 illustrates the fact that all rubber troubles may not be due to compounding. The view at the left is an original section of radiator hose. The center view shows the condition after boiling in a commercial alcohol-type anti-freeze, and the section of hose to the right is after immersion for 24 hours in a proposed anti-freeze.

Figure 21 illustrates four ways to reinforce radiator or heater hose: (1) wrapped with seven-ounces Osnaburg, (2) knitting, (3) braid, (4) wrapped with open-weave fabric. Of these, knitting the fabric reinforcement over the tube appears to offer some advantages.

The auxiliary rear spring, or so called spring bumper, offers another example of engineering development work in cooperation with the rubber companies.

Figure 22 shows the present form of this part and the deflection rate curve which specimens must meet. The dark band in the curve shows the desired tolerance for deflection; the lighter band shows observed variations in production lots. Various individually molded shapes tested at the rate of 40 strokes per minute for three hours failed owing to compounding, cure, or preparation. On individually molded parts it was difficult to check for porosity or undercuring.

The present practice is to mold the rubber in strips, and these strips after curing are cut into sections of proper length, which allows ready inspection for porosity or variations in hardness.

Many other problems confront the automotive engineer working with rubber parts—such as bonding to steel for engine supports, internal lubrication to avoid squeaks, surface finish of exposed parts, non-staining of car finishes, suitable weathering resistance, matching of colors, uniformity of sponge rubber, and control of odor—just to mention a few. The development of suitable specifications governing the quality of rubber desired has been a problem in itself. Our effort along this line is covered by the following tabulations: Table 1, 30 to 40 hardness group; Table 2, 40 to 50 hardness group; Table 3, 50 to 60 hardness group; Table 4, 60 to 70 hardness group; Table 5,

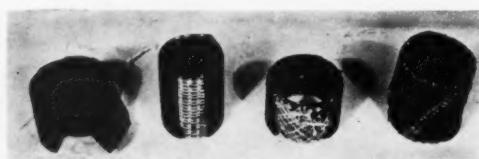


Fig. 21 Four Ways of Reinforcing Radiator or Heater Hose

TABLE 1. PHYSICAL PROPERTIES AND APPLICATIONS OF BLACK RUBBER COMPOUNDS

Tensile	Shore Hardness 30 to 40		Specific Gravity, Maximum
	Minimum	Elongation	
3000	800	95	1.10
2500	750	95	1.10
2000	700	90	1.15
1500	650	90	1.15
1000	600	85	1.20

TABLE 2. PHYSICAL PROPERTIES AND APPLICATIONS OF BLACK RUBBER COMPOUNDS

Tensile	Shore Hardness 40 to 50		Specific Gravity, Maximum
	Minimum	Elongation	
3500	600	90	1.10
3000	600	90	1.10
2500	600	90	1.20
2000	550	80	1.20
1500	500	80	1.25
1000	450	70	1.30
750	400	60	1.40

TABLE 3. PHYSICAL PROPERTIES AND APPLICATIONS OF BLACK RUBBER COMPOUNDS

Tensile	Shore Hardness 50 to 60		Specific Gravity, Maximum
	Minimum	Elongation	
3500	600	85	1.15
3000	550	85	1.20
2500	550	80	1.25
2000	500	80	1.35
1500	450	75	1.40
1200	400	75	1.45
1000	350	70	1.45
750	350	65	1.50
500	300	60	1.60

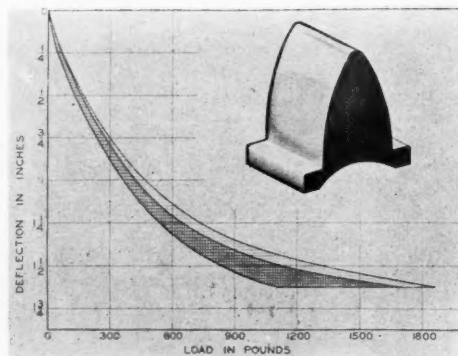


Fig. 22. Deflection Curve of Rubber Auxiliary Rear Spring

TABLE 4. PHYSICAL PROPERTIES AND APPLICATIONS OF BLACK RUBBER COMPOUNDS

Tensile	Shore Hardness 60 to 70		Specific Gravity, Maximum
	Minimum	Elongation	
3500	500	70	1.25
3000	500	65	1.25
2500	450	60	1.35
2000	400	55	1.45
1500	350	50	1.50
1250	350	45	1.55
1000	350	40	1.55
750	250	40	1.60
500	250	35	1.65

TABLE 5. PHYSICAL PROPERTIES AND APPLICATIONS OF BLACK RUBBER COMPOUNDS

Tensile	Shore Hardness 70 to 80		Specific Gravity, Maximum
	Minimum	Elongation	
3000	350	50	1.35
2500	300	50	1.40
2000	300	45	1.50
1500	250	40	1.60
1000	250	35	1.65
750	200	35	1.70
500	200	30	1.70

70 to 80 hardness group.

Specific gravity is included in these physical properties for the reason that it gives the inspection department an

opportunity for a quick check on the compound in the finished piece; since rubber parts are sold on the pound basis, but are designed and used on the volume basis, the lower the specific gravity for a given price per pound, the lower the cost of the parts, and this may offer an appreciable cost difference.

These groupings were worked out with the cooperation of representatives from several large suppliers of rubber products, modifying and adjusting various requirements until a reasonable agreement was reached. It is believed that they represent a fairly good picture of the physical property of the possibilities to be expected from rubber compounds; and that the general adoption of such a system would serve to guide both the engineer, in endeavoring to select suitable compounds, and the compounding, in endeavoring to satisfy the engineer while meeting the barrier of the purchasing department.

The following listing of rubber parts in a Pontiac automobile, compiled from Figures 1 to 7 inclusive by the staff of INDIA RUBBER WORLD, indicates the great number of applications of rubber in automotive engineering: 172 uses requiring 433 pieces.

USE	PART	NUMBER OF PARTS SHOWN IN PHOTOGRAPH
Fig. 1. Fan belt	500,064	1
Head Lamp Gaskets	504,329	4
Windshield Cleaner Connecting Tube	497,633	1
Hood Panel to Lower Catch, Plate	506,351	1
Front License to Bumper, Cushion	506,597	1
Ignition Wire Sleeve	496,465	4
Coil Ripple	499,544	1
Heater Pipe Grommets	503,425	2
Water Pump Bearing Seal	503,282	1
Radiator Cap Seal	499,561	1
Horn Button Ring Guide Insulator	506,097	2
Contact Separator	506,076	1
Ring Upper Spacer	506,077	1
Lower Spacer	506,078	1
Knuckle Support Upper Arm Bumper	1,298,323	2
Front Stabilizer Insulator	502,722	2
Suspension Bumpers	411,143	2
Rear Bumper Apron to Frame Support Cushion	506,057	2
Lower Arm—Inner Bearing Seal	411,146	2
Wire Retainer	494,104	1
Hood to Fender Bumpers	503,865	16
Air Cleaner Brace Insulator	499,465	1
Brake Adjusting Hole Cover	503,630	2
Knuckle Support Upper Pivot Seals	411,817	2
Radiator Baffle to Front Fender Welt	505,257	1
Hydraulic Brake, Wheel Cyl. Cups	231,333	4
Front Stabilizer Bar, Link Grommets	5,302,384	8
Grommet	44,226	1
Steering Idler Arm Bushing Seal	506,529	1
Lower Arm Outer Pivot Seal	411,382	4
Front Bumper Apron to Bumper Bar Cushion	505,941	2
Tie Rod Ball Socket Dust Seal	505,007	2
Engine Mountings—Front	503,637	1
Engine Mountings Rear R.H.	503,741	1
L.H.	503,742	1
Hydraulic Boot Wheel Cylinder Boot	231,335	4
Front Fender Lower Skirt Weld R.H.	505,570	1
to Body Anti-Squeak	506,216	2
Radiator Hose—Upper	506,227	1
Lower	506,228	1
Hydraulic Brake Hose—Front	2	
Front Fender to Body Anti-Squeak R.H.	506,217	1
L.H.	506,218	1
Battery Seal—Long	505,567	2
Short	505,568	2
(45 Uses)	Total..	197

Fig. 2. Pedal Pad, Clutch & Brake	502,100	2
Steering Column Toe Board Grommet	505,857	1
Accelerator Rod Bellows	505,779	1
Pedal	505,730	1
Grommet	493,908	1
Steering Column Bracket to Inst. Panel Washer Pad	499,140	1
Radio Grill Insulator (9/64 Dia. x 2" long)	117,961	2
Starter Pedal Pad	487,168	1
Master Cylinder-Brake Parts	501,461	2
Body Bolt Shims & Body Bolt Cushions	503,940	1
Windshield Wiper Connecting Tube	505,443	26
Rear Fender Door Bumpers	502,867	1
Front License to Bumper Spacer	505,823	2
Horn Button Contact Assembly	505,751	1
Rear Compartment Door Molding, Sealing Washer	505,984	4
Heater Air Intake Gasket	506,001	1
Grommets, Rear License Lamp	922,243	1
Heater Air Intake Gasket	506,000	1
Parking Lamp Gasket	754,124	2
Steering Wheel	505,567	1
Ignition Wires (8 Cyl.)	505,568	9
Grommet	505,569	1
Heater Hose (17 Ft. for Underseat Heater & W/S Defroster)	505,570	3
(27 Uses)	Total..	112

USE	PART	NUMBER OF PARTS SHOWN IN PHOTOGRAPH
Fig. 3. Tail Pipe Insulator	500,069	1
and Signal Lamp Pad	506,405	2
Pipe Support Strap	497,935	2
Rear Spring Seat Insulator	502,252	4
Tail & Signal Lamp Lens Gasket	5,931,534	2
Rear Compartment Molding Screw Covers	506,121	3
Shock Grommets	5,304,297	8
Fender Gravel Deflector, Inner Welt	505,190	1
Outer Welt	505,191	1
Hydraulic Brake Wheel Cylinder Cups	1,409,133	8
Brake Adjusting Hole Covers	503,630	2
Gearshift Selector Rod Insulator	502,488	1
Front Fender Skirt Baffle to Frame Filler	505,676	2
to Fender Upper Filler	505,566	2
Rear Auxiliary Spring	502,250	2
Spring Seat Pad Insulator Bushings	502,249	4
Hydraulic Brake Hose, Rear	505,577	1
Rear Bumper Apron Filler	506,322	1
Strg. Col. & Pedal Toe Bird. Pads	506,326	1
License Lamp Pad	1,313,045	1
Gearshift Selector Rod Insulator	503,873	1
Radio Speaker Gasket	1,214,399	1
Antenna Parts	7,240,989	1
	506,295	1
Voltage Regulator Mountings	1,442,257	1
Vacuum Antenna Tubing	505,149	1
Lead-in	505,362	1
Rear Fender Gravel Guards R.H.	505,362	1
L.H.	505,363	1
(32 Uses)	Total..	68

Fig. 4. Front Seat Mat Rear	H-66,111	1
Rear Lid to Gutter Silencer	A-85,791	1
Fender Anchor Nut Gasket	1,222-X-1,650	1
Door Locking Knobs Grommet	7,263-W376	4
Ventilator Gasket	H-75,095	1
Instr. Panel Brace Silencer	H-77,272	1
Window Stop Bumpers	H-71,477	4
Door Lock Weatherstrip	1,298-X-0325	4
Check Link Cushion	H-33,596	4
Windshield Strip	H-75,055	1
Windshield	H-75,061	1
Channel	H-76,050	2
Door Hinge Weatherstrip	H-75,496	2
Gutter Drain Tubes	H-60,444	2
Front Arm Rest	H-77,122	1
Rear Window Channel	H-64,988	1
Rear Quarter Arm Rest Foundation Pad R.	H-64,989	1
Foundation Pad L.	H-75,397	1
Window Weatherstrip R.	H-75,398	1
L.	H-75,912	1
Ventilator Drain Tube	H-76,387	2
Door Channel Weatherstrip	H-76,050	4
Hinge Side Weatherstrip	H-30,974	2
Rear Lid Lock Silencer	Total..	43

Fig. 5. Rear Comp. Weatherstrip	1,369-X-8,800	1
Hood Ledge Lacing	H-75,383	1
Front, Rear Door Weatherstrip	1,369-X-8,200	4
Door Opening or Pads	H-75,326	2
Rear Door Opening Rocker Mat R.	H-75,331	1
L.	H-75,332	1
Front Seat Cushion (Sponge)	H-66,020	1
(7 Uses)	Total..	11

Fig. 6. Rear Seat Cushion (Sponge)	H-66,022	1
Bumpers	H-77,756	2
Drain Hole Plugs	H-74,750	4
Wheel House Drain Hole Plug	H-32,889	10
Channels	H-76,386	2
Spacers	H-33,087	2
Wiring Grommet	H-32,782	1
Weatherstrip	H-66,008	2
W/S Wiper Gaskets	H-75,381	2
Silencers	H-75,747	2
Door Panel Silencer	H-73,890	2
Seat Adj. Lock Bar Sup. Silencer	H-77,210	1
Rad. Sup. to Inst. Panel Silencer	H-77,271	1
Inst. Panel to Shroud Brace Silencer	A-85,769	1
Door Handle Hole Silencer	H-70,594	1
Rear Compt. Lid Hinge Silencer	H-77,119	2
Support Inner Panel Silencer	H-77,128	1
Sun Shake Plugs	H-76,332	2
Door Bumpers	H-30,913	4
Drain Hole Plug	H-70,814	2
Rear Deck Bumpers	H-75,552	2
Comp'l Lid Lock Silencer	H-30,974	2
Ventilator Window Channels	T-82,838-9-CV	2
Plug	H-73,887	1
Door Vent Silencers	H-75,783	6
Rocker Mat Grommets	H-76,595	20
Door Weather Strips (Frt.)	H-76,053	1
Door Bottom Corner W/S	H-76,057	3
Door Hinge Bumpers	H-76,058	3
Instrument Panel Support Silencer	A-87,000	4
Silencer	H-72,620	1
Filler Washers	H-77,212	1
Door Fillers	H-72,751	4
Sponge Rubber Filler	1,170-X-2,250	2
	1,170-X-3,600	2
(36 Uses)	Total..	100

Fig. 7. Front Mat (Front)	H-66,121	1
Dash Liner Strip	H-75,738	1
(2 Uses)	Total..	2

Synthetic Rubber in the Automotive Industry

From the Viewpoint of the Automotive Engineer

J. C. Zeder²

IN THE past few years, the automobile industry has begun to attach considerable importance to research and development work on elastic synthetics. Our own laboratories have been especially concerned over the possible applications of synthetic rubber because Chrysler Corp. cars and trucks employ more rubber in their construction than any other car on the market. Further, we are deeply conscious of the significance in the introduction of any new material because of our experience in laboratory research. We have found that as development work proceeds along any aspect of our engineering program, there eventually comes a time when we are seemingly brought to a full stop by the limitations of the materials and methods at our disposal. When this happens, we find it imperative to direct our efforts toward the development of a new material or process, or to perfect the available material before progress can be continued. Our appreciation of this fact is reflected in the theme of our new experimental and research laboratories.

New Engineering Materials

To cite one example illustrating this, we can point to the evolution of our rear axle design. Gear men formerly employed an assumption in their calculations of a 1,300-pound per lineal inch maximum allowable tooth load. This assumption necessitated a rear axle ring gear diameter of at least 13 inches for the car which we were planning to build. With an adequate road clearance below the axle, and jounce space above it, this 13-inch diameter placed the passenger car entirely too far above the ground. So, in our laboratories, we developed testing instruments and procedure to measure the stresses in the gear. We found that owing to deflection of the gear tooth only a part of the tooth widths were actually in contact, but at this contact a maximum stress of 1,900 pounds per inch prevailed. So the gears were made more rigid to secure full contact; design was made on a basis of a 1,900 pounds per inch allowable tooth load, and the gear diameter was reduced to 10½ inches. Then the metallurgist improved the steel in the gear, and we brought the diameter down to 9¾ inches. The introduction of the hypoid axle further reduced the diameter to 8¼ inches, and here we were halted because a lubricant was not available which would withstand the extreme pressures associated with a further reduction in size. So we turned to the development of a good extreme pressure lubricant, which we now have. The size of the gear is down to 8¼ inches, and we are looking forward to the possibility of an even further reduction.

At the present time a number of refinements are waiting only for the discovery of a better material. For instance, the only thing preventing us from decreasing the brake drum from a 12-inch to perhaps an 8-inch diameter is the maximum pressure which the lining will endure. All the other parts of the brake mechanism can be subjected to greater pressures, and if a better synthetic material can be developed for the lining, this reduction will be made, and we will have a smaller and a better brake.

¹ Paper presented before the Division of Rubber Chemistry on Sept. 12, 1940, at the one hundredth meeting of the A. C. S. held in Detroit, Mich.

² Chief engineer, Chrysler Corp., Detroit, Mich.

The same thing is true in the instance of the clutch plate lining.

Synthetic materials may solve the problem of a suitable fabric for automobile use. We now make cars of metal and rubber which will stand up for a number of years, but the fabrics used in the upholstery are perishable and cannot be expected to last for the life of the car. They do not have the endurance or the appearance of the other materials after service. The automobile industry needs an attractive looking non-perishable fabric, possibly of synthetic origin.

Another application in which progress is awaiting the development of a new material of better qualities is the hydraulic brake system. The vital element of this brake is the seal, which prevents the leakage of the fluid from the system.

To understand the function of this seal, imagine the developed circumference of all the brake cups in the car—a length of better than 35 inches—stretch along a surface moving along against a pressure of 1,500 pounds per square inch and wiping the surface completely dry without a leak of even pin-point proportions. These seals were first experimentally made of leather, but leather seals proved unsuccessful because they were shriveled up by the high temperatures of the body paint baking ovens.

Our laboratories eventually developed a rubber seal which withstood both extremes of temperature. With these brake cups, however, it is necessary to use a special kind of brake fluid; ordinary lubricating oil cannot be used because of its deteriorating effect on rubber. If a synthetic material can be developed which will not swell when exposed to lubricating oil, the tremendous expense of a special brake fluid can be eliminated.

Rubber Supply

The necessity of an adequate rubber supply for use in tires and other rubber parts is obvious, and the automotive industry is extremely interested in any substitute for this rubber that can be provided for future emergency. The slowing down of automobile manufacture through shortages of raw materials would prove very distressing to the financial and industrial structure of this country. We realize that the quantities of synthetic rubbers now produced are of only minor importance compared to the total rubber used, but the capacity for manufacture of man-made rubber should be stepped up rapidly so as to be available in time of any national emergency.

The most certain way of expanding our production capacities for synthetic rubbers is to develop uses for them in such places where cost penalties will not be a major objection and where the man-made rubber may stand on its own as an engineering material. In only a few instances has synthetic rubber been substituted for natural rubber. There are many automotive parts in service that would have been impossible if natural rubber had been

the only material available. Also synthetic rubber has frequently taken the place of natural materials that have qualities not easily varied to suit the engineer's needs or qualities that vary so much in nature that it is desirable to use manufactured materials which will maintain a uniformity of characteristics.

Automotive Applications

Two or three years ago the characteristics of an ideal synthetic rubber for automotive uses were well defined. Because of the more recent development of several trends in the uses of these materials, we are now confronted with the necessity of defining the ideal specifications for three or four groups of synthetic rubbers. The one quality that is demanded of most rubber parts is a resistance to flow under the heat and pressure of service. Strange as it may seem, we have one group of automobile parts, now, that must be processed with a rubber that will flow and change shape with heat and pressure. Examples of such parts are the synthetic rubber-coated gaskets developed in our laboratories. These gaskets are made from various tough set-resistant papers that are coated with a layer of "Thiokol" to seal completely the porous body of the paper. When these gaskets are bolted tightly between the surfaces to be sealed for oil leakage, the "Thiokol" flows into every tool mark or imperfection in the machined surface so as to make a perfectly sealed unit. At the same time, it maintains a continuous coating on the paper so as to prevent leaking of oils or gasoline and also to prevent the paper from becoming hard and brittle owing to exposure to dry heat. "Thiokol"-dipped gaskets are used in most places on Chrysler Corp. cars and trucks where a perfect seal is needed and where the surfaces in general are flat enough so that a gasket of extreme yield is not needed.

Another interesting development was that of a compound of neoprene and cheap lignin which was found to have most of the good characteristics of cork and none of the poor aging qualities. These gaskets, when used on valve covers and other such parts which must withstand oil, gasoline, and high temperatures, stood up amazingly well. In some instances such a material has withstood temperatures of 600° F. for 24 hours without evidence of failure.

One of the greatest difficulties in the development of the direct-acting shock absorber was in obtaining satisfactory oil seals. The seal used in this shock absorber must withstand reciprocating motion and must seal against a very light oil at temperatures often in excess of 400° F. High temperatures and abrasive dust constitute such a serious problem that it was necessary to experiment under the most varied climatic conditions in this country and in South America. Final solution to this condition was found in a combination of leather and neoprene, ground up into a mass and cured, and seals of this composition without change have been used in direct-acting shock absorbers since that time.

In recent years there has been a growing tendency on the part of manufacturers of anti-freeze to add a mineral oil sealing ingredient to their products. The resulting troubles with the rubber in the cooling system are immediately obvious. All natural rubber exposed to a sufficient concentration of the mineral oil was seriously attacked with the result that thermostats failed to close, pressure caps failed to hold, and rubber radiator and heater hose collapsed or swelled shut. Polymers of butadiene were found to be the only materials that would withstand the mixtures of oil and alcohol.

At the present time all diaphragms, gaskets, and sealing

members in the cooling system are made of such polymers. It would be very desirable to make cooling-system hose of synthetic rubber, but so far the increased cost has been prohibitive, and it has been necessary to develop natural rubber stocks having the greatest possible resistance to solvents.

Engine crankshaft seals from the early days of the industry have been a difficult problem for the engineer. Tight, hard packings gripped the crankshaft and either scored the shaft or disintegrated because of overheating. We have developed seals of neoprene and butadiene rubber which will successfully retain the oil with a minimum of radial pressure on the crankshaft and will withstand the occurring extremes of heat. Compounded with anti-friction materials, they will wear for the life of the car.

Boots used in the ball and trunnion type of universal joint have for many years been made of leather. Synthetic rubber boots were finally designed to withstand grease, moisture, friction, and the abrasive action of dust and stones much more effectively than would those of leather. However, synthetics still failed to be flexible at extremely low temperatures, but by improved compounding, our laboratory has eliminated the cold failure, and synthetic rubber propeller shaft boots are standard on our 1941 models.

At first synthetic rubber development proceeded in the direction of obtaining more satisfactory substitute materials. As this progress continued, the use of synthetics resulted in a broader range of application in the solution of problems attending new developments. For example, the automatic transmissions, clutches, etc., are in many cases activated by devices employing rubber diaphragms working by means of vacuum. These diaphragms are subjected to high temperatures and to the deteriorating effect of oils and gasoline vapors. In addition they must function from -40° F. to better than 200° F. Satisfactory Perbunan-type compounds have been developed to withstand all of these conditions, and these also are featured on 1941 models.

These examples of present-day use of synthetics, along with other examples shown, demonstrate very well the present and future possibilities for synthetic rubbers. A great increase in manufactured volume can be expected, even with only the present available materials. However, with the development of new materials that will better withstand cold, that are more rapidly processed, and that are more universally available at lower cost, synthetics will provide industry with materials of tremendous possibilities.

Facts about U. S. Industries

(Continued from page 36)

the Census of Manufactures, during the years 1919 to 1939, follows:

Year	Pounds	Square Yards	Value
1939	163,389,300	208,890,000	\$37,786,000
1937	167,688,400	203,020,200	46,929,700
1935	118,303,700	146,968,500	39,939,000
1933	117,780,000	146,208,000	31,754,000
1931	137,400,000	158,337,000	41,250,000
1929	250,504,000	302,864,500	111,720,800
1927	197,353,000	225,931,600	80,974,200
1925	189,345,200	242,126,500	105,625,900
1923	163,686,900	226,555,100	106,079,600
1921	96,247,300	95,656,500	101,652,400
1919	158,091,000	180,271,000	175,688,000

No separate data on the manufacture of tire fabrics in cotton mills of the U. S. are available for 1914 or prior factory canvasses.

EDITORIALS

Progress in the Rubber Situation

ON FEBRUARY 22, 1941, Jesse H. Jones, Federal Loan Administrator, indicated his confidence that we would continue to get crude rubber from the Far East and that we would be able to accumulate substantial reserves. When questioned directly as to the probability of interruption of shipments as a result of the frequently discussed imminence of war activities in the Far East, Mr. Jones stated that he was confident that we would be able to secure sufficient stocks. He explained that the war and the long distances of transportation for many strategic materials before entry into the United States had created a number of problems, but that these were not such as to endanger long-range planning for the expanded industrial and defense capacity of this country. Mr. Jones emphatically denied reports that a shortage of shipping facilities are holding up deliveries of rubber and metals purchases.

Such statements as the above, from a man who is in a position to know and whose business it is to know the situation thoroughly, can only be construed as minimizing the recently more prevalent reports of alarm as to continued flow of rubber imports either because of direct war activities or a shortage in ship tonnage. There has been a continued increase in the use of American ships until now when, according to an article in the February issue of *Agriculture in the Americas*, published by the United States Department of Agriculture, American-borne imports of rubber "have increased now to well over 50%", whereas at the end of the first quarter of 1940 only 24% was transported in American ships in comparison with 20% in 1938. This rapid increase during the past 10 months indicates that steps have been taken to insure transportation facilities.

According to the statement by Mr. Jones on February 22 the Rubber Reserve Co. had purchased 113,893 long tons of rubber, of which 63,264 tons had been received, 23,776 tons were afloat, and 26,853 tons were awaiting shipment. This is in addition to the rubber obtained by the Government under the Barter Agreement and represents an increase of 10,748 tons in deliveries and 24,895 tons in purchases by the Rubber Reserve Co. since Mr. Jones' previous statement on January 16.

Total domestic stocks of crude rubber at the end of January are estimated by The Rubber Manufacturers Association at 340,857 tons, an increase of 7% from December 31, of which the total government-held rubber was 134,338 tons, or 19.1% higher than at the end of 1940. Of importance when considering available stocks is the fact that United States consumption for January, estimated by the Association at 64,225 tons, is 12.4% higher than the previous high record in October, 1939.

Although as of February 22, 1941, the total shipments

of 87,040 long tons of rubber to the Rubber Reserve Co. are below the minimum shipment of 100,000 tons prior to December 31, 1940, as called for in the initial agreement of June 29, 1940, the commercial stocks have been increased so that in the aggregate the United States stocks of crude rubber have been more than doubled during the seven months since June 30, 1940. Inasmuch as the conditions of the agreement included a stipulation that commercial stocks of 150,000 tons would be maintained and as these stocks on January 31 had risen to 206,519 tons, the total United States stocks are approximately up to the minimum schedule. Likewise in this same period the amount of rubber afloat to this country has risen from 119,138 tons to 153,169 tons, or 29%. The action on February 25 of the International Rubber Regulation Committee to continue the 100% permissible shipments should assist in further accumulation.

Reclaimed rubber production has been maintained at a slightly higher rate than consumption during the past seven months so that actual stocks are now higher and constitute approximately the same position in terms of months of supply.

The potential of synthetic rubber has been broadened since June 30, 1940, as more sources of supply now exist and more varieties are being produced in limited quantities, but because of greater demand for defense preparations the relative position has not become such as to make any available for possible commercial substitution for crude rubber. It has been reported that the Reconstruction Finance Corp. has been considering the desirability of loans to producers for expanding their output as a defense measure, but there is no indication of a decision.

Of the five government survey parties sent to Central and South America last year to investigate the probabilities of expanding crude rubber growing in the Western Hemisphere, the one headed by Dr. E. C. Stakman has returned and although no final report has yet been released indications are that the various governments are interested in such a development and that plans have been worked out for establishment of cooperative experiment stations with the United States Department of Agriculture supplying high-yielding strains of rubber. From Mexico City came a statement on February 23 that the United States and Mexican Departments of Agriculture have concluded an agreement for intensive scientific experiments in rubber production.

On the whole our position in this country as related to an insured supply of the basic raw material for the rubber industry has been much improved during the past seven months, and the prospects appear much more reassuring, particularly as the groundwork has been well laid for still further improvements in our position. Nevertheless our utmost efforts to this end should continue.



EDITOR

What the Rubber Chemists Are Doing

Symposium on New Developments in the Processing of Rubber



**To Be Held at the Meeting of the Division of Rubber Chemistry,
A. C. S., Hotel Mayfair, St. Louis, Mo., 1.30 p.m., on April 10, 1941**

R. H. GERKE, of the research laboratories of the United States Rubber Co. and chairman of the Rubber Division, has told us that those persons should attend the symposium, who wish to know:

- (1) Of the rapid strides being made by the rubber industry in utilizing new processes and new equipment?
- (2) In what directions leaders in the rubber industry are moving?
- (3) What your competition is doing?
- (4) How these new developments are going to affect you?

Cold Resistance of Synthetic Rubber



By
**W. J. McCourtney,
Chrysler Corp.**

die and almost instantly ejecting the product. The process has six advantages over compression and other older methods of molding. Modern injection molding equipment is of three types: hydraulic, mechanical, and a combination of these two, and the latest advances incorporated in this equipment are higher locking pressure, larger platens, and higher capacity cylinders. (A motion picture, lantern slides, and a display of products will amplify Mr. Paine's remarks.)

the finished product can be checked by means of new applications of the X-ray, sound meters, and traction slip recorders. Although instrumentation has come a long way, the rubber industry is still faced with many major unsolved problems.

Instrumentation in the Rubber Industry



By
**C. P. Bosomworth,
Firestone Tire &
Rubber Co.**

Mr. McCourtney will say: An accurate method for determining the cold resistance of rubber has been developed. This method is used to check the cold resistance of various synthetic rubbers and various compounds of these rubbers, and the effects of different methods of processing. All tests are run at -40° C. The results show that small variations in processing and compounding show up greatly in stiffening characteristics at low temperatures.

Injection Molding



By
**H. W. Paine, M.
L. Macht, and W.
E. Rahm, Plastics
Department, E. I.
du Pont de Nemours & Co., Inc.**

Mr. Paine will say: Injection molding is a process of forming articles by molding a powder, forcing it by hydraulic, mechanical, or air pressure through a small orifice or gate into a cold, closed

Mr. Bosomworth will say: The rubber industry, like most others, is having to meet increasingly rigid specifications, and wherever possible the elimination of human variability must be considered through the introduction of machines equipped with accurate instruments. The use of instruments has made possible the present-day rapid mixing and stock preparation in tubers and Banburys. Great savings have resulted from the use of automatic cycle controllers in connection with tire and tube curing. Accurate plasticity controls allow for the correct shaping and size of extruded products at definite processing speeds. We are able to employ super-active chemicals in compounding only through the ability of instruments to maintain accurate curing temperatures. Finally,

Mechanical Developments in the Processing of Rubber



By
**Andrew Hale,
Farrel-Birmingham
Co., Inc.**

Mr. Hale will say: A one-man mill room is not an idle prophecy, but will probably be a part of the rubber factory of the near future. Huge crackers, capable of taking entire cold bales, will deliver warm and softened rubber direct to plasticators without manual assistance. A higher production of broken-down rubber will issue from these plasticators in pellet, not sheet, form to be delivered to large bins, equipped with agitators for blending unprecedented quantities. Compounding ingredients, rubber and reclaim pellets will be fed from an orderly array of bins to automatic scales with their respective poises remotely controlled from a common control board which will also command the Banbury cycles. Finally, the sheeting mill will be replaced by a screw-fed pelletizer which will receive the charge direct from the mixer and deliver mixed stock pellets, automatically cooled, to individual bins. Here each batch will await laboratory release and then proceed to mills for warming and incorporation of sulphur.

Solvents and Plasticizers to Be Discussed at Boston

AT A meeting of the Boston Group, Rubber Division, A.C.S., to be held on Friday evening, March 28, at The University Club, Boston, Mass., John B. Tuttle, of the Standard Oil Co. of New Jersey, will present a paper on "Petroleum Products in Rubber", dealing with petroleum solvents, plasticizers, and reclaiming oils. The paper will be followed by a brief open discussion on the subject. For entertainment "Demonstrations of Psychological Deceptions for Agile Minds", will be presented by Bertram Adams, past president of The Society of American Magicians and Founder of The International Society for Mystic Research.

Entertainment Featured at Los Angeles Meeting

THE monthly meeting of the Los Angeles Group, Rubber Division, A.C.S., held at the Mayfair Hotel, Los Angeles, Calif., February 4, with 111 members and guests in attendance, featured a program of entertainment under the sponsorship of the Kirkhill Rubber Co. Musical selections were rendered by Dubb Taylor, motion picture artist, who was assisted by several talented young ladies. The speaker for the evening was Ed Ainsworth, author of "Pot Luck" and other humorous works, who delighted his listeners with a recital of his experiences in searching for unusual news items. Two motion pictures, one showing the development of rubber plantations in Sumatra, and the other on the war in Europe and the preparation of the United States for defense, were shown.

The door prize, an order for a pair of rubber shoes, was donated by T. Kirk Hill, president of the Kirkhill company, and won by J. H. Riddell (U. S. Rubber). Frank L. Shew (Darnell) won the special prize, a portable radio, donated by Ed Royal, of the H. M. Royal, Inc. Table favors, consisting of rubber bath mats, were distributed by the Kirkhill company. The next meeting will be held on March 4.

Detroit Group Combines with Plastics Division

AT a recent meeting of the executive committee of the Detroit Rubber Group it was decided that the Group join with the Plastics Division of the Detroit area to form a new organization to be known as the "Detroit Rubber & Plastics Group." W. B. Hoey was appointed by the Plastics Division as its representative on the executive committee.

The new group was scheduled to meet on February 28 at the Hotel Whittier, Detroit, Mich., to hear Gordon Brown, sales manager of the Bakelite Corp., speak on "Evaluating the Moldable Plastics," and see the movie, "Magic of Modern Plastics," presented through the courtesy of *Modern Plastics*.

Buffalo Rubber Group

AT A meeting of the Buffalo Group, Rubber Division, A. C. S., at the Hotel Lenox, Buffalo, N. Y., on February 28, Roy Clay, power plant engineer of the Curtiss Aeroplane Division of the Curtiss-Wright Corp., was scheduled to speak on "The Use of Rubber in the Construction of Modern Aircraft." The next meeting of the group is tentatively set for the first week of May.

Holt, Viles, and Amstuz to Address N. Y. Group

THE next meeting of the New York Group, Rubber Division, A. C. S., will be held at the clubrooms of the Building Trades Employers' Association, 2 Park Ave., New York, N. Y., on March 21, with the technical session scheduled for 4 p.m. and dinner at 6.30 p.m. The program follows: "What Is Being Done to Insure Adequate Crude Rubber Supplies for the U. S." by A. L. Viles, president, Rubber Manufacturers Association and chairman of the Buying Committee of the Rubber Reserve Commission; "American Scrap Tire Resources," by Everett G. Holt, chief, Leather and Rubber Division, Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce; and "Electrocoating," John Amstuz, Behr-Manning Corp., Division of Nor-

ton Co. Tickets, which are \$2, may be obtained from the secretary-treasurer, B. B. Wilson, INDIA RUBBER WORLD, 420 Lexington Ave., New York, N. Y.

At a meeting of the executive committee of the Group on February 5, June 6 was selected as a tentative date for the annual outing and a continuance of the annual Paper Essay Contest was voted.

Sections Meetings

H. I. CRAMER, secretary, Division of Rubber Chemistry, American Chemical Society, spoke on "Synthetic Rubber and Synthetic Elastics before the Northeast Wisconsin Section, Appleton, January 28, the Minnesota Section, Minneapolis, January 29, the Wisconsin Section, Madison, January 30, and the Milwaukee Section, January 31. Along with the lecture Dr. Cramer showed a rather extensive exhibit of synthetic rubbers and rubber-like materials, cured and uncured, resulting from present-day American manufacture.

Foster Dee Snell, head of the consulting firm of Foster D. Snell, Inc., 305 Washington St., Brooklyn, N. Y., on February 7 addressed the New York Section, A. C. S., at the Hotel Pennsylvania, New York, N. Y., on "Some Factors in Detergency."

Aeronautical Group Hears Schade on Synthetic Rubber

COMPOSITIONS of synthetic rubbers offer no marked advantage over natural rubber compounds in respect to mechanical properties, but are far superior in resisting certain deteriorating influences, James W. Schade, director of research of The B. F. Goodrich Co., pointed out in a paper entitled "Rubbers, Natural and Synthetic," presented at the Organic and Synthetic Materials Session at the ninth annual meeting of the Institute of Aeronautical Sciences, at the Biltmore Hotel, New York, N. Y., on January 30.

After reviewing the basic chemical and physical concepts relating to the various synthetic rubbers and natural rubber, Mr. Schade outlined the mechanism of vulcanization, predicted new copolymer synthetics from as yet untried combinations, and discussed the improvement and modification of all rubbers, natural and synthetic, through compounding technique. A chart was presented, indicating the relative merits of natural rubber, neoprene, "Thiokol", Koroseal, Perbunan, and oil-resistant Ameripol in respect to a number of physical properties and resistance to the deteriorating influence of chemicals, aging, solvents, oils, and sunlight.

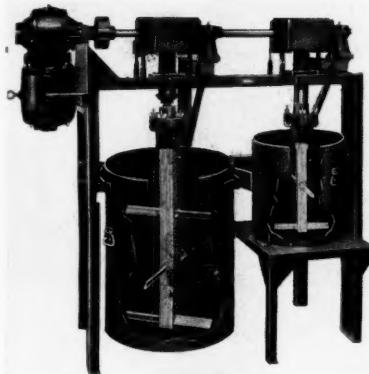
In citing synthetic rubber applications, Mr. Schade mentioned Koroseal tank linings to resist the action of strong oxidizing solutions such as chromic acid and nitric-hydrofluoric acid mixtures, "Thiokol" tubes of hose to conduct lacquer solvents and thin-

ners; and neoprene surface coatings for rubber airplane deicers to resist sunlight cracking and checking. By compounding neoprene with graphite, sufficient conductivity is obtained to prevent static discharge through the deicer structure, it was pointed out. Shoe soles of Koroseal will outwear rubber compounds of the same hardness, and this synthetic has found wide use as insulation or as oil-resistant sheathing on wire and cables, according to the speaker. Printing rollers of synthetic not only resist the action of oils and driers in ink, but do not soften, when heated, as do glue-glycerine rollers. This, Mr. Schade said, led to the adoption of synthetic rollers for the new printing process used by the newspaper *PM*, in which solid ink must be melted by heated rollers on the press. Rubber bearings which rapidly failed, when used on vessels habitually in oily water, were successfully replaced with synthetic bearings. Synthetic rubber was adopted for hydraulic brake hose for use with fluids containing mineral oil, but natural rubber has proved adequate for use with fluids of the glycerol type, the speaker said.

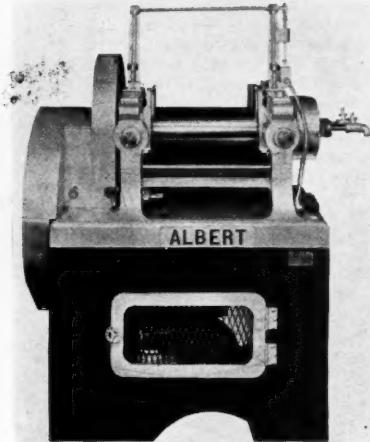
Mr. Schade emphasized that different grades of gasoline and oil affect synthetics differently; gasolines containing benzol, for example, are more severe in their action than aliphatic hydrocarbons alone, and all lubricating oils designated by the same S.A.E. number are not

(Continued on page 54)

New Machines and Appliances



Day Liquid Mixer



Two-Roll Laboratory Mill

Foam Rubber Mixer

THE Day Foam Rubber Mixer, while designed primarily for incorporation of vulcanizing and blowing agents in rubber latex mixes, can be used on any process where the material does not have a viscosity higher than 200,000 centipoises. Equipped with removable wooden agitators, these mixers are made singly or in gangs and in a range of working capacities. For higher viscosities a heavier-type machine is advised. The J. H. Day Co., Cincinnati, O.

Hose Testing Device Builds up 25-Ton Pressure

HOSE required to withstand high pressures in service is tested on a new pump that will build up a pressure of 50,000 pounds per square inch. Referring to the photograph, the hose is attached at the valve shown in the right foreground. Because of the tremendous force exerted, the hose, while under test, is encased in a metal guard so as to eliminate any possibility of accident to the operator. Testing engineers have found the new device of considerable value in the improvement of high pressure hose. The pump is in use in the laboratories of The B. F. Goodrich Co., Akron, O.

Albert Laboratory Mill

INCORPORATED in the design of a new laboratory two-roll mill are a number of interesting structural features. The housings, which are of the top cap type, are cast integral with the base so that no misalignment can exist. All bearings are full brass lined, and gears are machine cut with a herringbone drive-gear and pinion. The mill also features: two-piece guides; forged rolls of specially processed steel and with uniform interior for uniform heating and cooling; a magnetic-type brake and safety mechanism for quick stopping; and a self-contained motor. The



Hose Testing Apparatus

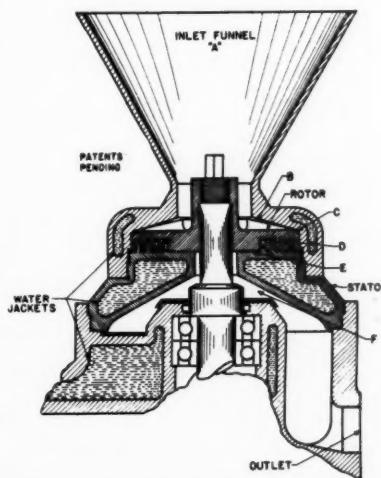


Diagram of Triple-Action Colloid Mill



Model 11 Vibrometer

mill, said to be quiet in operation, occupies a floor space of 40 by 30 inches. L. Albert & Son, Trenton, N. J.

Vibration Micrometer

THE Model 11 Vibrometer provides a simple means for determining the effectiveness of vibration isolating materials used in machine, automobile, and aircraft design. The instrument indicates vibration amplitude from 0.00001-inch to one inch directly on a nine-inch meter, with an accuracy of 3% on all four scale ranges. Based on the electronic principle of measurement, this portable vibration micrometer weighs 19 pounds and is made of heavy sheet steel to withstand hard usage. Televiso Products, Inc.

Colloid Mill Features Three-Stage Action

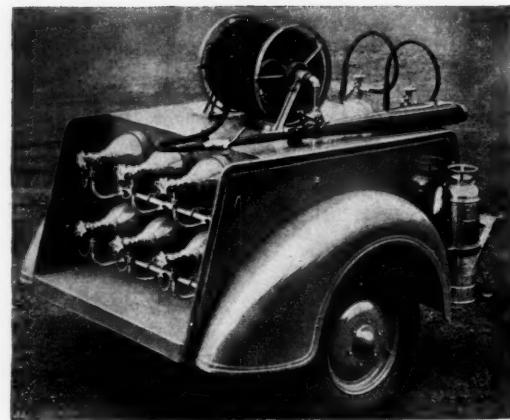
THE Triple-Action colloid mill is said to disperse effectively in aqueous medium, fillers, colors, waxes, and resins used in the compounding of latex. The essential feature of the mill is that the material to be processed is forced between the rotor and stator against centrifugal force.

Referring to the diagram, material is fed downward through a receiving funnel *A* and encounters the impeller vanes *B* on top of the rotor traveling at 10,800 r.p.m. These vanes force the material to the periphery of the rotor at pressures as high as 150 pounds per square inch for some materials. The material is sheared at *C* in passing downward between the side of the rotor and the housing (first processing action), is then impelled against centrifugal force by the pressure of oncoming material through a labyrinth of tight fitting circular rings *D* (second processing action), and then forced across the smooth section *E* between the rotor and stator (third processing action). The processed material drains from the chamber *F* through the side discharge outlet without having

come in contact with packing or glands at any time during passage. The labyrinth *D* is formed usually of plain rings machined on the bottom of the rotor and the top of the stator, but all or any of these rings may be cut clockwise or counter-clockwise and with additional radial slots if desired. Also a rotor and a stator without the labyrinth may be used. The clearance between stator and rotor can be adjusted and then locked.

Standard machines utilize: bronze rotor, stator, and inlet chamber; stainless steel inlet funnel; and semi-steel housing. However machines can be made in other metals. Jackets are provided in the stator and housing for heating or cooling. It is claimed that these mills can be disassembled and cleaned in from two to three minutes. There are four

This mobile fire fighting unit, designed primarily for combating fires in flammable liquids and electrical equipment, was perfected by Walter Kidde & Co., Inc. For use as a trailer, the unit carries six 50-pound carbon dioxide cylinders equipped with hose reel and nozzle, two portable 15-pound carbon dioxide extinguishers, and two 2½-gallon pure water extinguishers.



**Seybold
Precision
Grinder**

sizes with four-, six-, nine-, and 12-inch diameter rotors. The C. O. Bartlett & Snow Co.

Grinder for Straight Knives

THE Seybold precision knife grinder, made in three standard sizes: 70-, 100-, and 128-inch lengths, is said to produce a keen, true cutting edge that requires little honing on practically all types of straight knives—shear blades, beveled knives, scraper or doctor blades, etc. Equipped with an automatic grinding wheel feed and a centrifugal pump cooling system, the machine features a hollow three-sided knife bar, each surface presenting a different series of grinding angles. A fourth open side permits easy bolting of the blade to the knife bar. All gears and clutch operate in an oil bath. Seybold Division, Harris-Seybold-Potter Co.

Aeronautical Group

(Continued from page 52)

alike in their action. Also the degree of swelling is not always indicative of the value of a compound, because some which swell but slightly become weak and inextensible in contact with oils.

In conclusion, Mr. Schade made a forceful plea for purchasers of synthetic rubber products to specify acceptance tests rather than to designate the type of synthetic to be used. In view of the experience of rubber technologists this would inevitably result in the purchaser obtaining higher quality and better value for his expenditure.

to be held at The Mayflower Hotel in Washington, D. C., March 3 to 7. Committees D-11 on Rubber Products and D-13 on Textile Materials are scheduled to meet during the week. The symposium on particle size will be held Tuesday afternoon and evening, March 4; while the color symposium will be held on Wednesday afternoon.

Ontario Section Meets

AT A meeting of the Ontario Rubber Section, Canadian Chemical Association, held at the University of Toronto, Toronto, Ont., on February 20, three papers were presented. O. B. Crowell, Viceroy Mfg. Co., spoke on "Rubber Substitute as a Compounding Material," describing the different types of substitute with a discussion of the uses and advantages of each type. The ease in mixing, tubing, and calendering were stressed by the speaker.

In a paper, "Engineering and General Uses of a Pyrometer in a Rubber Factory", C. L. Brittain, of Gutta Percha & Rubber, Ltd., briefly described the various types of thermocouples and potentiometers used in a

rubber factory and discussed their use in obtaining satisfactory cures in thick blocks of rubber, rubber tires, belting, etc. The use of thermocouples for checking temperatures in hot air vulcanization was also brought out. L. A. Winters, of the Dunlop Tire & Rubber Goods Co., Ltd., who had just returned from England, spoke on "Some Recent Experiences in Britain." Mr. Winters gave an excellent description of aerial warfare over England and told of the extensive preparations for invasion that had been made.

Thomas Batty, of the Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., has been appointed secretary-treasurer of the section, to fill the office left vacant by R. B. Symons.

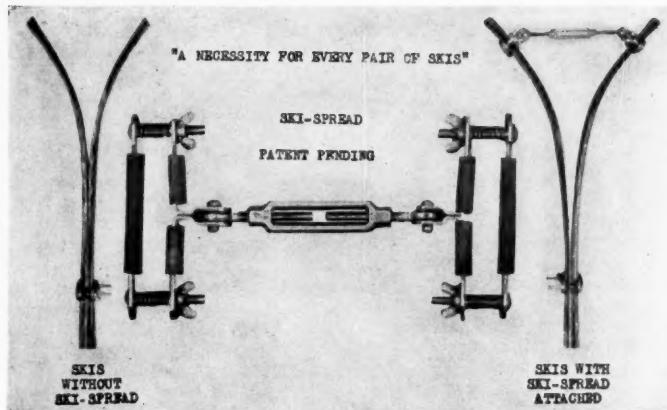
Rhode Island Club to Meet March 14

THE Rhode Island Rubber Club will hold a meeting on Friday, March 14, at the Narragansett Hotel, Providence, R. I., with dinner scheduled for 7 p.m. sharp. A sound motion picture on Africa will be shown.

Two Symposiums to Feature A.S.T.M. Spring Meeting

TWO technical symposiums, one on New Methods for Particle Size Determination in the Subsieve Range, the other on Color—Its Specification and Use in Evaluating the Appearance of Materials, will be features of the Spring Meeting and Committee Week of the American Society for Testing Materials

New Goods and Specialties



Device for Spreading Skis

Rubber Protected Ski-Spread

SKI-SPREAD, a device for retaining the correct curvature on all types of skis, is made of rustproof cadmium steel, having clamp sections with a protective covering of gray corrugated rubber tubing, $\frac{1}{2}$ -inch inside diameter and $\frac{1}{16}$ -inch wall. Individual rubber-cushioned clamps without the spread feature are used for holding the skis firmly together along the straight portions. The Ski-Spread Co.

New Neoprene Gloves

TANZOIL white all-neoprene gloves and suede-finished neoprene-coated gloves are two recent applications of this synthetic. The white glove, made by the Pioneer Rubber Co., is designed for use by employees of meat-packing and food-processing plants, dairies, etc., where regulations require that white accessories be worn by employees. The new white compound is odorless and

non-toxic and is said to possess the inherent capacity of neoprene to resist oils, grease, fats, lactic acid, cleaning compounds, and other materials common to the food industries.

The coated glove, introduced by the Hood Rubber Co., is produced by giving an even coating of neoprene to lightweight flannel gloves and has a suede finish that assures a firm grip. Intended for gardening use as well as general household work, the new glove is easily slipped on or off and is made in gun-metal color with flesh-toned lining.

Conductive Rubber Goods Reduce Operating Room Hazards

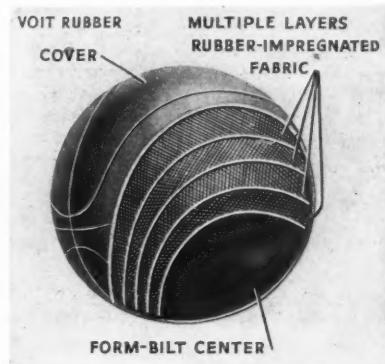
THE accumulation of electrostatic charges and their discharge in the form of a spark presents a serious fire hazard in operating rooms containing the flammable vapors of anesthetics. To combat this condition a line of rubber

goods capable of dissipating electrostatic charges has been developed.

The rubber flooring, made $\frac{3}{8}$ - and $\frac{1}{4}$ -inch thick, has an embedded wire mesh to maintain high conductivity parallel to the surface. Between the mesh, which is electrically connected to ground, and any body resting on the floor, there is a layer of conductive rubber only $\frac{1}{16}$ -inch thick, thus assuring low resistance between the body and ground. Other conductive rubber goods which have contributed to operating room safety include: anatomical masks; face cushions for use with metal or celluloid face inhalers; straps and retainers for inhalers; bushings; chair and stool tips; casters and wheels; breathing bags; and various types of tubing. The Ohio Chemical & Mfg. Co.

Rubber-Covered Balls

ENDURO basketballs, footballs, soccer, volley, water polo, and tether balls are made from multiple layers of long-staple heavy cotton fabric which have been thoroughly impregnated with rubber. The layers are built up by hand



Enduro Rubber-Covered Ball

over an inflated ball center, and then a rubber cover is applied. The whole is vulcanized into a chafeless, friction-free, symmetrical, one-piece unit of uniform balance. An all-rubber valve, which is molded into the ball, is used. Balls made by this process are said to be scuff-proof, virtually puncture-proof, and weather- and water-proof. W. J. Voit Rubber Corp.

Rubber-Cork Air-Cell Soles

THE small particles of cork introduced by a special process into the rubber compound used for Vul-Cork shoe soles are said to form thousands of pin-point air-cell vacuum cups that provide the necessary suction to prevent slipping. Other claims for Vul-Cork soles are: insulation against heat, cold, and dampness; lightness in weight; resiliency and flexibility; and long wearing qualities. While the new soles are especially suited for service shoes worn by industrial workers, they are also made in a complete range of colors for dress and sport shoes. Vul-Cork may also be finished to simulate a leather sole in appearance. Cambridge Rubber Co.



Stanzoil White Neoprene Gloves



Suede-Finish Neoprene-Coated Gloves

UNITED STATES

Limited Capacity May Check Further Advancement of Industrial Activity

Business activity continued at a record-breaking pace, although expansion was at a rate less than in previous months. New orders are greater than production, and operating capacity is a limiting factor, with backlog increasing, and delivery periods being lengthened.

Employment is still gaining, but the shortage of skilled workers has become acute in some fields. Certain companies have inaugurated training programs, and as a greater labor supply becomes available, production is expected to advance. As a result of the increased demand for labor, the number of strikes has been increasing, in some instances retarding the volume of production.

Building awards last year were the greatest since 1930, and 1941 is expected to better the 1940 rate because of the defense projects under way. Footwear output in 1940 approached 400 million pairs, about 6% under the banner year of 1939, and the trade, in view of the public's increased purchasing power, anticipates a good spring season and believes 1941 shoe production will be above the 1940 estimate. Wool and cotton goods mills, at a high level of operations, have enough orders on hand

to maintain present schedules well into spring. Automobile production has been rising steadily. January output, at about 525,000 cars and trucks, was the highest since May, 1937, when the total was 540,377. Capacity in the steel industry has been raised to 84,148,000 net tons for 100%, and with this change ingot output was set at 97.1% early in February, for the all-time high in tonnage, then varied between 94.6% and 96.3% largely because of labor troubles and mill shutdowns for repairs. Tin output, increasing consistently, is expected to gain substantially in the near future. After declines at the end of January, advances later were reported for oil, paper, and rayon output and carloadings; while fluctuations occurred for lumber and paperboard, and continued declines were noted in power output.

Rubber manufacturers are operating at the same high level as in January, with all branches of the industry at full speed. National defense orders are benefitting the mechanical goods field more than other parts of the industry. The value of manufacturers' shipments of rubber products continues to gain, and that of inventories also registered a rise.

Rubber Products Manufacturing Industry Committee

Appointment of a committee of fifteen for the rubber products manufacturing industry was announced on February 25 by General Philip B. Fleming, administrator of the Wage and Hour Division of the United States Department of Labor. The committee will hold its first meeting at the Washington Hotel, Washington, D. C., March 25. Its personnel follows:

For the Public: Arthur T. Martin (chairman), Ohio State University, Columbus, O.; William Haber, University of Michigan, Ann Arbor, Mich.; Edmund D. McGarry, University of Buffalo, Buffalo, N. Y.; Alexander Hamilton Frey, University of Pennsylvania, Philadelphia, Pa.; Frank Lewand, Catholic University, Washington.

For the Employes: Frank P. Fenton, director of organization, A. F. L., Washington; Sherman H. Dalrymple, president, United Rubber Workers of America, Akron, O.; George Cummins, president, U. R. W. L., Mishawaka, Ind.; Margaret C. Hemrick, U. R. W., Ravenna, O.; George R. Bass, president, U. R. W. Local, Akron.

For the Employers: Thomas G. Graham, vice president in charge of manufacturing, B. F. Goodrich Co., Akron; Leo Larkin, general manager, La Crosse Rubber Co., La Crosse, Wis.; Paul H. Henkel, secretary and general manager,

Continental Rubber Co., Erie, Pa.; F. Thatcher Lane, president, Seamless Rubber Co., New Haven, Conn.; M. I. Woythaler, treasurer, Hodgman Rubber Co., Framingham, Mass.

The rubber products manufacturing industry is estimated to employ approximately 130,000 workers, about 10,000 of whom receive less than 40¢ an hour. The committee is empowered to recommend minimum wages up to 40¢ an hour.

The rubber products manufacturing industry for the purpose of the committee investigations includes, "the manufacture of all products which have as an ingredient any form of natural rubber (including latex) reclaimed rubber, scrap rubber, compounded rubber, rubber derivatives, balata, gutta percha, or synthetic rubber, including parts for use in other products, and including footwear made by the vulcanizing of the entire article or the vulcanizing (as distinct from cementing) of the sole to the upper; the manufacture of reclaimed rubber; and the preparation of scrap rubber for use in the manufacture of reclaimed rubber or rubber products." It is specifically noted that abrasive wheels, brake linings, and insulated wire and cable are exempted from the definition of the manufactured rubber products industry.

CALENDAR

Mar. 3-7. A. S. T. M. Committee Week and Spring Meeting. Mayflower Hotel, Washington, D. C.

Mar. 4. Los Angeles Rubber Group. Mayfair Hotel.

Mar. 7. Nichols Medal Award. Chemists' Club, New York.

Mar. 10-15, 17-29. American Toy Fair. New York.

Mar. 12-14. "5&10" Packaging Show and Conference. Hotel Astor, New York.

Mar. 13-14. SAE National Aeronautic Meeting. Washington Hotel, Washington.

Mar. 14. Rhode Island Rubber Club. Narragansett Hotel, Providence, R. I.

Mar. 17-19. N.A.W.M.D. Convention and Exhibit. Hotel Sherman, Chicago.

Mar. 21. New York Rubber Group. Building Employers' Trade Ass'n.

Mar. 21. Akron Rubber Group. Akron City Club.

Mar. 28. Boston Rubber Group. University Club.

Apr. 1. Los Angeles Rubber Group. Mayfair Hotel.

Apr. 1-3. A.S.M.E. Spring Meeting. Atlanta, Ga.

Apr. 10-11. Rubber Division, A.C.S. Spring Meeting. Mayfair Hotel, St. Louis.

May 19-21. American Institute of Chemical Engineers. Edgewater Beach Hotel, Chicago

May 22-23. Association of American Battery Manufacturers, Inc. Spring Meeting. Hotel Statler, Detroit.

While the manufacture of rubber products is carried on in almost all sections of the country, the major number of establishments are in the New England, Middle Atlantic and East and West North Central states. According to the 1937 Census of Manufacturers there were a total of 478 establishments, 406 of which were located in these geographic areas.

"The definition of the rubber products manufacturing industry covers all occupations in the industry which are necessary to the production of products covered by the definition, including clerical, maintenance, shipping, and selling occupations; provided, however, that this definition does not cover clerical, maintenance, shipping, and selling occupations when carried on in a wholesaling or selling department physically segregated from other departments of a manufacturing establishment, or when carried on in an establishment the greater part of whose sales are of products not covered in the definition; and provided, further, that where an employe covered by this definition is employed during the same workweek at two or more different minimum rates of pay, he shall be paid the highest of such rates for such workweek, unless records concerning his employment are kept by his employer in accordance with applicable regulations of the Wage and Hour Division."

EASTERN AND SOUTHERN

First Rubber Survey Group Back from South America

The United States Department of Agriculture on February 4 stated that the first of its rubber survey parties, which left this country last August, had returned after surveying an area covering roughly the headwaters of the Amazon tributaries east of the Andes in Peru and west of the Andes in Ecuador and Colombia. The party, under the leadership of E. C. Stakman, chief of the Division of Plant Pathology and Botany at the University of Minnesota and agent of the Department, also included E. M. Blair, rubber technologist, M. M. Striker, soil specialist, and A. E. Skutch, botanist. Doctor Stakman reported a cordial reception everywhere and said that his party was joined by scientists of the governments that were visited.

The purpose of the survey was to find areas most suitable for commercial rubber growing and to arrange for nurseries for large-scale propagation of *Hevea* seedlings to be used as rootstocks on which to multiply the superior strains already assembled by the Department from world-wide sources. Two locations in Peru, one in Colombia, and one in Ecuador were selected for nurseries which will become part of a chain extending throughout the tropical areas of

Central and South America. To date nurseries have been arranged for or planted in more than a dozen localities, and between three and four tons of seed have been planted. All countries participating will share the superior disease-resistant strains already developed. The survey group also collected seeds from wild rubber trees that might have potential value in those countries.

Three other parties are still investigating—in Panama, in Brazil, and in Mexico. Another group is in the Philippine Islands, collecting seed and budwood. Upon their return, at least two experimental stations will be located, where problems of breeding, culture, and disease control will be studied. This work will be under the direction of the Bureau of Plant Industry. The Office of Foreign Agricultural Relations is responsible for coordinating the Department's rubber research with work of other federal agencies.

The entire rubber investigation including the preliminary surveys is being conducted in cooperation with Latin American Republics that have climate and soil suitable for rubber growing. Results of the work will be made available to all countries cooperating and to large and small growers.

Division of Priorities of the Office of Production Management, Washington, D. C., on February 1, through Director E. R. Stettinius, Jr., announced the organization of five administrative groups within the division to handle minerals and metals, commercial aircraft, chemicals, tools and equipment, and general products. The Chemicals Priority Committee consists of the chairman, who is the Chemicals Priority Executive, Garrison E. Howe, editor of *Industrial and Engineering Chemistry*; representing producers, Warren Watson, executive secretary, Manufacturing Chemists Association; representing industrial consumers, Everett Trigg, president, John Lucas & Co.; representing the Army and Navy, respectively, Major C. B. Morgan and Lieut. N. S. Prime. Irving Cornell, vice president, St. Joseph Lead Co., will represent the producers on the Non-Ferrous Metals and Minerals Committee.

On February 20, Mr. Stettinius named priority committees for rubber and for hides, skins, and leather. The rubber committee consists of A. L. Viles, president of The Rubber Manufacturers Association, Inc., representing the producers; Major G. K. Heiss, the Army; Commander H. M. Shaffer, Navy, and W. L. Finger, of the R.M.A., representing the OPM. A representative of the industrial consumers will soon be appointed. At the same time Mr. Stettinius announced that Philip Reed, chairman of the board of General Electric Co., has been appointed a consultant to the director of priorities.

Government Needs Technologists

The United States Civil Service Commission has announced an open competitive examination to secure technologists for national defense work. As difficulty is being experienced in filling positions in such branches of technology as rubber, explosives, fuels, plastics, minerals, and textiles, persons qualified in these fields are urged to file applications, which will be rated as received until December 31, 1941. Duties include planning, conducting, and reporting investigation or research, or testing, designing, or manufacturing materials essential for the successful operation of an industrial plant where such plant operation is based on some specialized branch of technology.

Positions to be filled are in several grades with salaries ranging from \$2,600 to \$5,600 a year. Competitors will not be given a written test, but will be rated upon their education and experience.

Further information and application forms may be obtained from the Secretary of the Board of U. S. Civil Service Examiners at any first- or second-class post office or from the U. S. Civil Service Commission, Washington, D. C.

Nearpara Rubber Co., Trenton, N. J., has let a contract for the rebuilding of two one-story structures recently destroyed by fire. One building will be 60 by 150 feet, and the other 15 by 300 feet. The company is very busy turning out reclaimed rubber.

Acute Shortage of Oxides from Zinc Metal Feared

A sharp decrease in the available supply of zinc metal has resulted in a curtailment of the production of French-Process-type oxides which are derived from the metal. There is no shortage, however, of American-Process-type oxides, which are produced directly from the ore, and producers are reported to have ample production capacity to care for all consuming needs. The present demand for zinc metal is measurably in excess of available smelting capacity; a large portion of the world's smelting facilities are in areas blockaded by England. With large quantities of zinc required for national defense, producers have taken steps to assure supplies for military needs and thus combat the necessity of priorities. In the meantime the zinc industry is taking measures to increase output of metal, according to a recent statement by C. H. Crane, president, St. Joseph Lead Co., 250 Park Ave., New York, N. Y.

Currently the situation in regard to French Process oxides is such that producers are limiting shipments to a certain extent. A stoppage of supplies would interfere with the production of some high-grade paints, enamels, and ceramic products, but fortunately these metal zinc oxides can be replaced, at least to a large extent, in rubber compounds by American Process oxides.

The New Jersey Zinc Co., 160 Front St., New York, supplier of French Process and Palmerton Process (Kadox) zinc oxides which are produced from the metal, predicted the possibility of curtailed supplies in the February issue of *The Activator*. A series of rate of cure charts, which the firm had previously published several years ago, were reproduced in this issue to show the results to be expected with various types of zinc oxides when used with different accelerators in rubber compounds. These charts, resubmitted to assist in the evaluation of American Process oxides for various compounds, emphasize that the behavior of different types of zinc oxide in rubber compounds is not easy to predict, and that when zinc oxide is used solely for activation (approximately 5% on the rubber), there is generally little practical difference in curing rate between the different oxides. The differences between fast and slow curing oxides become significant only when higher loadings are employed (e.g. 18 volumes), according to *The Activator*.

Shell Oil Co., Inc., 50 W. 50th St., New York, N. Y., has awarded a contract for the construction of a plant at its Houston, Tex., refinery for the manufacture of butadiene, basic ingredient of several types of synthetic rubber. Construction of this plant, which represents a definite contribution in the development of synthetic materials required for national defense, is to start immediately. Scheduled to be in operation by early summer, it will have an annual capacity in excess of 5,000 tons.

Rubber Products in Demand at Notion & Novelty Exhibit

A brisk demand was reported for rubber and related items on display for buyers at the Sixth National Notion & Novelty Exhibit held at the Hotel Pennsylvania, New York, N. Y., from February 3 to 8.

The Seamless Rubber Co., New Haven, Conn., featured its new Cro-Shay bathing caps, molded with a crochet-knit pattern; Sheerine rainwear with two-tone color effects, shirred waistbands, and hoods; all-rubber undergarments; and fabric-lined latex gloves with a rough non-slip finish. The Plymouth Rubber Co., Inc., Canton, Mass., offered new styles in latex bathing caps; a military cap protector of latex; innovations in men's and ladies' rainwear; and its line of waterproofed infants wear accessories. Beautis Foundations Mfg. Co., 358 Fifth Ave., New York, exhibited two-way stretch girdles, including nylon types, together with other women's underwear. Similar items were displayed by Sturm-Scheinberg, Inc., 45 W. 25th St., New York. W. J. Caley & Co., 3214 Chestnut St., Philadelphia, Pa., again featured Kay-lee rubber-aluminum hair curlers. Bolta Rubber Co., Inc., 111 Eighth Ave., New York, N. Y., showed hard rubber and plastics combs. Clip-type clothes pins with rubber-covered tips were offered in drier sets and as

bed comforter anchors as well by the Hobar Sales Co., 208 Fifth Ave., New York.

Richards, Boggs & King, Inc., 34 W. 33rd St., New York, featured innovations in Goodyear Pliofilm and Pliosheen-coated fabrics of Du Pont's Cordura rayon. New powerful permanent magnets are now used along the bottom edge of shower curtains to force the curtains against bathtub walls. The magnet is also used as a closure for garment bags and rainwear. Protex Products Co., Jersey City, N. J., introduced boudoir cabinets for shoes, lingerie, etc., with a covering of laminated wallpaper and clear Pliofilm. Other Protex Pliofilm products included: shoe bags, bridge table covers with suede corners, and a heavy-weight men's apron for chemists, etc. Koroseal products were shown for the first time at the show by The Warren Featherbone Co., Three Oaks, Mich. The line included new styles in aprons, blanket and garment bags, raincoats, and make-up and shower capes.

The I. B. Kleinert Rubber Co., 485 Fifth Ave., New York, held its annual preview of spring and summer notions at the Hotel Plaza, showing its new Actioneer girdles, dress shields, beauty kits, and beach accessories.

Monsanto's Rubber Service Department Occupies New Research Laboratory

The Rubber Service Department of Monsanto Chemical Co. has recently completed a new chemical laboratory at Nitro, W. Va., for its research and analytical staff. Constructed of fireproof bricks and with the inside walls of glazed tile and the floor covered with composition tile, this single-story structure is equipped with a large blower, which changes the air three times per minute, and of which the roof is so designed as to support a layer of water—an effective cooling aid during West Virginia's hot summer months. The new building contains a library, an analytical laboratory, five research laboratories each accommodating two chemists, a store room, work room, and a locker room with shower baths.

The library includes a comprehensive collection of reference books on pure chemistry as well as rubber chemistry and technology, and it receives the leading chemical and rubber magazines published here and abroad.

The chemical staff, under the direction of R. L. Sibley, consists of two research engineers, five analytical chemists, one latex technologist, and a number of laboratory assistants, and devotes its entire time to the study of chemicals for use in rubber and latex. Present investigations include the development of new accelerators, antioxidants, softeners, retarders, and materials for the prevention of flex-checking. Latex compounding is carried out here, but testing of all rubber products is done in the rubber testing laboratory, housed in a separate building.



New Research Laboratory of the Rubber Service Department of Monsanto Chemical Co. at Nitro, W. Va.

Identification of new materials and control analysis of raw materials for plant production are conducted in the analytical laboratory, thus permitting the research staff to concentrate solely on exploratory work. Also, the analytical laboratory tests each batch of rubber chemicals manufactured in the plant, thus assuring a uniform specification product.



Blank & Stoller

Frank S. Malm

Malm 35 Years with Bell

On January 22, Frank S. Malm completed 35 years of continuous service with the Bell System and at the recent annual dinner of the Bell Telephone Laboratories chemical research department was presented with a seven-star service emblem by R. R. Williams, chemical research director. Mr. Malm has devoted the greater part of this time to work on rubber for the Western Electric Co. and the Bell Telephone Laboratories in the United States and abroad.

He entered the students course in Western Electric's Hawthorne works in 1906 and engaged in installation work and then in switchboard cable design. In 1908, Mr. Malm went to the company's rubber division and later took charge there of chemical engineering and development work on soft and hard rubber. In 1920 he transferred to the submarine cable development branch where he assisted in the manufacture and laying of two rubber insulated cables between San Pedro, Calif., and Catalina Island. Then in 1929 Mr. Malm sailed for Europe as a representative of the Bell Laboratories to assist in the manufacture of submarine cable insulated with Paragutta, a development which was a great aid in expanding long-distance submarine cable telephony. Three years later he returned to the Bell Laboratories in New York, where he is now engaged in special rubber studies.

He has contributed to the scientific literature and has been granted a number of patents relating to rubber. In

1938, Mr. Malm was elected a Fellow of the Institution of the Rubber Industry, which is a recognition of achievement in the rubber industry. At present he is serving as a director of the Division of Rubber Chemistry of the American Chemical Society and as chairman of the electrical section on hard rubber, a subsection of the American Society for Testing Materials.



A. E. Boss

Columbia Chemical Announcements

Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, Pa., according to W. I. Galliher, director of sales of the Columbia Chemical Division, last month opened a chemical sales office at 615 Johnston Bldg., Charlotte, N. C. District sales manager is James R. Simpson, former director of the appointments' office of Duke University.

A. E. Boss has been made manager of pigment sales of the Columbia Chemical Division, with headquarters at 30 Rockefeller Plaza, New York, N. Y. Dr. Boss, formerly manager of the technical service department, joined Columbia in 1932 after four years as a research chemist on pigments at The B. F. Goodrich Co., Akron, O. An alumnus of the University of British Columbia, he received his Ph.D. from the University of Illinois and was a research instructor at Oberlin College. Dr. Boss is a member of the Division of Rubber Chemistry, A.C.S., and was vice chairman, chairman, and councilor of the Akron Section of the Society.

John A. Roebling's Sons Co., Trenton, N. J., has appointed Ernest C. Low general manager of sales. With the company 32 years, Mr. Low for the past year served as president and general manager of John A. Roebling's Sons Co. of California.

Jos. Stokes Rubber Co. is operating to capacity with many new orders on hand at its plants in Trenton, N. J., and Welland, Ont., Canada.

U. S. Rubber Activities

Recognizing the importance of rubber mountings, United States Rubber Co., 1230 Sixth Ave., New York, N. Y., held the first national conference, in Detroit, Mich., January 23 to 25, of development and sales engineers to discuss exclusively rubber mountings and their industrial applications. In charge of the sessions were C. A. Russ, head of the New Products Department of the Mechanical Goods Division, and W. C. Keys, New Products engineer.

John J. Caskey, general manager of Naugatuck Chemical Division of U. S. Rubber, on January 30 addressed the Lions Club of Waterbury, Conn., on "Reclaiming of Rubber from Old Tires."

Veteran Employees Pensioned

U. S. Rubber has announced the retirement of 30 veteran employees of its Passaic, N. J., divisions under its retirement allowance plan for those who reach 65 years. Among those affected are: Edward Gruehl, superintendent of the belting division, who had been with the concern 50 years; Frank R. Grady, general foreman of the fire hose department; James King, foreman; Arthur Brown, superintendent of the hose division; Edward Hughes, stock room director; Joseph Meyers, foreman of the grinding wheel department; and Albert Wells, hose department specification clerk.

Naugatuck Aromatics Purchases House of Riviera Products Co.

Naugatuck Aromatics, division of U. S. Rubber, at 12 E. 22nd St., New York, recently bought the House of Riviera Products Co., 215 W. Ohio St., Chicago, Ill., following the death of the former owner, Joseph De Lorme, and has moved its Chicago headquarters from 440 W. Washington St. to the Riviera address. Harold J. Edmon, for many years Naugatuck representative in the Chicago district, is in charge of the new organization, which also includes Bruno T. Grabowski, perfumer, and Mrs. E. L. Begley, long connected with the House of Riviera. Maurice G. Couderchet is manager of Naugatuck Aromatics' New York office.

Rubber Springs for Mine Cars

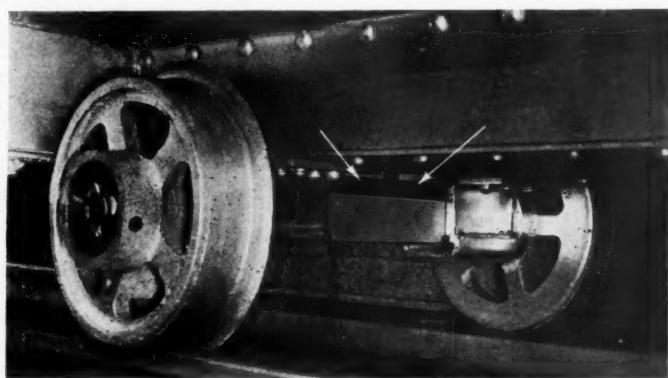
Rubber springs for mine cars, announced by the manufacturer, U. S. Rubber, are being introduced on 300 new cars built by Irwin Foundry & Mine Car Co., Irwin, Pa., for service at the Kehoe-Berge Coal Co., Pittston, Pa. Two types of rubber spring, one a cylindrical shear and the other a compression type, are used. On each car four shear springs, each measuring $\frac{1}{4}$ - by $3\frac{1}{8}$ - by $3\frac{3}{4}$ -inch, carry an empty load of 5,000 pounds. Four compression-type springs carry the total load of car and coal, 19,000 pounds. Each spring measures 4- by 13- by $1\frac{1}{4}$ -inch.

The need of unusual springs was realized when in the design of the new car the dead weight was to be reduced to increase the car's load-carrying capacity. It was necessary to use springs that would have the required stiffness in the transverse and lateral directions while the vertical direction of force remains soft enough to give the necessary deflection. Rubber springs were chosen because, when properly engineered, they give the desired spring rate in any of the three directions. In the case of a steel spring it is difficult to resist the motion in either the transverse or lateral direction without friction.

Rubber springs will not fail as a result of crystalline fatigue or corrosion, and because there is no metal to metal contact between the car axle and the car, noise and friction are reduced. Also the danger of derailment is lessened because the rubber springs exert a load on each wheel of 1,400 inch pounds. This factor is of importance because trackage in mines, except main lines, is temporary and likely to be unlevel.

U. S. Tire Dealer Advisory Council

The 1940 U. S. Tire Dealer Advisory Council held its final session at the Edgewater Beach Hotel, Chicago, Ill., January 20 and 21. The meeting was in charge of J. C. Ray, manager of tire distribution, who presented plaques to the retiring members: Ned Miller, of New York; Jewett Davidson, of Evansville; R. P. McClure, of Dallas; Harold C. Heym, of Detroit; Jack Abrams, of Spokane; L. C. Stickney, of Sterling, Colo.; L. D. Mosher, of Hollywood;



Compression-Type Rubber Springs on Mine Car with the Rubber Indicated by Arrows

Sam Green, of Norfolk; and C. A. Latcham, of Denver. Others present were E. J. Bassine, Chicago district manager; F. M. Stewart, manager of automobile tire department; and M. N. Brady, divisional manager of Chicago.

Fisk Dealer Council Meeting

On February 17 and 18 the Fisk Tire Dealer Advisory Council met at the U. S. Rubber Bldg. in New York to discuss advertising, sales, and merchandising. Among those attending were: L. H. Duggan, of Springfield, Mass.; J. and F. Donaldson, both of Stockton, Calif.; C. B. Witt, Tampa, Fla.; H. C. McDermott, sales manager of Fisk Tires; T. E. Hogan, Boston, Mass.; M. H. Crowe, San Francisco, Calif.; J. Stratmeyer, Reading, Pa.; and C. A. Clark, Waterloo, Iowa.

New Merchandising Aid

U. S. Rubber has developed a new "Constant Charger" that keeps one to six new display batteries fully charged at all times and will not overcharge them. It merely replaces the power all batteries lose through self-discharge while idle. It can be plugged into any 110 V-60 Cycle AC light socket and is easily installed on the back of the U. S. "Sell-On-Sight" Merchandiser, a display rack holding six batteries. These are hooked up to the charger by special caps placed over the battery terminals. The positive cap is luminous and lights up when the "Constant Charger" is working.

This device affords the dealer an opportunity to give an extra measure of quality service so important in modern merchandising. It is the first of a series of new and unique merchandising aids that U. S. Rubber will announce to its dealers this year.

Trenton, N. J., rubber manufacturers, busy with greatly increased production on all lines of goods, declare there is cause for complaint in the margin of profits. Mercer Rubber Co. has practically doubled its output as has the Crescent Wire & Cable Co. The Thermoid Co. is operating to capacity; while The Vulcanized Rubber Co., Morrisville, Pa., is working overtime on hard rubber products.

Puritan Rubber Co., Trenton, N. J., hit upon a novel idea recently to keep the plant in operation after its boiler equipment had broken down. The concern arranged with the railroad company to run a locomotive on a siding and furnish steam to the factory until repairs were made to the boilers. The company reports operating normally. Treasurer Miah Marcus and his family have been vacationing at Miami, Fla. Robert Marcus was on a business trip through Texas.

Pierce-Roberts Rubber Co., Trenton, N. J., according to President Harry W. Roberts, has received enough orders for druggists' sundries and other products to keep operating a double shift for some time.

Supply Contracts Awarded

The following were included among recent listings of supply contracts awarded by various departments of the United States Government:

NAVY: *benzol*, Neville Co., Pittsburgh, Pa., \$7,416; *cable*, Anaconda Wire & Cable Co., New York, N. Y., \$201,782; *Collyer Insulated Wire Co.*, Pawtucket, R. I., \$301,468; *General Cable Corp.*, New York, \$546,081; *General Electric Co.*, Schenectady, N. Y., \$221,132; *National Electric Products Corp.*, Pittsburgh, \$282,992; *Okonite Co.*, Passaic, N. J., \$7,210; *Phelps Dodge Copper Products Corp.*, New York, \$614,334; *Rockbestos Products Corp.*, New Haven, Conn., \$7,276; *United States Rubber Co.*, New York, \$111,712; *cotton canvas*, Wellington, Sears Co., New York, \$94,202.60; *erasers*, American Lead Pencil Co., Hoboken, N. J., \$5,409; *hose*, Boston Woven Hose & Rubber Co., Cambridge, Mass., \$13,279; *Quaker Rubber Corp.*, Philadelphia, Pa., \$16,704; *manganese linoleate and resinate*, American Cyanamid & Chemical Corp., New York, \$16,267; *masks, half*, Mine Safety Appliance Co., Pittsburgh, \$90,023; *slab zinc*, New Jersey Zinc Sales Co., Inc., New York, \$8,250; *thermometers*, Taylor Instrument Cos., Rochester, N. Y., \$17,391.

WAR: *bags*, *Pliofilm*, Shellmar Products Co., Mt. Vernon, O., \$76,050; *brushes, shaving*, Rubberset Co., Newark, N. J., \$18,900; *bushings*, Firestone Tire & Rubber Co., Akron, O., \$1,005; *cable*, Electric Auto-Lite Co., Port Huron, Mich., \$4,200; *cable assemblies*, U. S. Rubber, \$810,209; *conveyers, alteration of*, Goodyear Tire & Rubber Co., Akron, \$2,705; *cordage*, Simplex Wire & Cable Co., Cambridge, \$169,005; *cotton cloth*, Vulcan Proofing Co., Inc., Brooklyn, N. Y., \$32,725; *detonators*, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., \$30,055; *enamel*, Pittsburgh Plate Glass Co., Pittsburgh, \$33,000; *face blanks*, Acushnet Process Co., New Bedford, Mass., \$1,425; *gaskets and cement*, B. F. Goodrich Co., Akron, \$1,291; *hose*, Goodyear, \$3,978; *mouthpieces*, General Tire & Rubber Co., Akron, \$32,760; *oil retainers*, Victor Mfg. & Gasket Co., Chicago, Ill., \$2,020; *plaster, adhesive, rain-coats*, Chicago Rubber Clothing Co., Racine, Wis., 10,000 coats, U. S. Rubber, 152,225 coats; *shoes*, Hood Rubber Co., Inc., Watertown, Wis., \$274,300, U. S. Rubber, \$283,658; *sporting goods*, J. De Beer & Son, Albany, N. Y., \$22,200, M. Denkirk & Co., Johnstown, N. Y., \$80,593, Dewey & Almy Chemical Co., Cambridge, \$937, P. Goldsmith Sons, Inc., Cincinnati, O., \$28,045; J. H. Grady Mfg. Co., St. Louis, Mo., \$11,999; Grier Mfg. Co., Greenville, S. C., \$38,700, H. Harwood & Sons, Natick, Mass., \$17,070; Ken-Well Sporting Goods Co., Inc., Utica, N. Y., \$17,066, Ohio-Kentucky Mfg. Co., Ado, O., \$23,090, Post Mfg. Co., New York, \$630, Premier Gym Mat Co., New York, \$26,147, Rawlings Mfg. Co., St. Louis, \$24,369, Seamless Rubber Co., New Haven, Conn., \$3,776, A. G. Spalding & Bros., Chicopee, Mass., \$57,459, Wilson Sporting Goods Co., Chicago, \$56,511; *surgical dressings*, Johnson & Johnson, New Brunswick, N. J., \$130,588; *tape*,

adhesive, Coated Products, Inc., Bound Brook, N. J., \$7,275; *tires*, Dayton Rubber Mfg. Co., Dayton, O., \$6,202; *webbing*, United Elastic Co., Easthampton, Mass., \$39,767; *wheel and brake assemblies*, Goodyear, \$923,504; *wire*, General Cable, \$245,044, Phelps Dodge, \$202,605.

State of New York Department of Labor, Albany, N. Y., through its Division of Industrial Hygiene is offering to manufacturers free of charge, the services of its technical staff of physicians, chemists, and engineers to prevent occupational injuries and disease in their plants.

Essex Rubber Co., Trenton, N. J., has enough business on hand to keep the factory busy until late in the spring.

Amthor Testing Instrument Co., Inc., formerly of 10 Leo Place, Brooklyn, N. Y., recently purchased its own two-story factory building at 45-53 Van Sinderen Ave., Brooklyn, where larger and finer facilities enable the company to take care of a greater volume of business.

Morrison Rubber Co., Trenton, N. J., has increased output. President Thomas Morrison was on a lengthy business trip through the South and Texas.

Vulcan Proofing Co., First Ave. and 57th St., Brooklyn, N. Y., last month announced that John G. Harrison, Jr., joined its staff as research chemist. For the past six years he had been associated with the Firestone Tire & Rubber Co. in its laboratories at Akron, O., and Memphis, Tenn.

Whitehead Bros. Rubber Co., Trenton, N. J., has purchased a large plot adjoining its plant along the Pennsylvania Railroad for future expansion of the plant. The company is very busy filling government orders. Treasurer R. J. Goehrig recently completed a business trip through the Midwest.

Hercules Powder Co., Wilmington, Del., has announced the resignation of Thomas W. Bacchus as a director and vice president, an office he held since the company was organized in 1913.

Lee Tire & Rubber Corp., Conshohocken, Pa., last month held its annual stockholders' meeting at which President A. A. Garthwaite stated the outlook for 1941 is encouraging. He also reported that output at the company's mechanicals plant at Youngstown, O., was rising to meet increased demand from the automobile industry. The company is erecting new storage warehouses at Conshohocken and Youngstown and has already installed new machinery in both plants, increasing capacity about 16%.

Arthur M. Youngs, owner of the Youngs Rubber Corp., Trenton, N. J., recently was married at Yardley, Pa., to Miss Bertha Stoy.

OHIO

Goodrich News

The B. F. Goodrich Co., Akron, is redeeming 340 \$1,000 First Mortgage Bonds, 4 1/4% Series Due 1956, out of the sinking fund. The principal amount of each bond designated plus a premium of 2 1/2% and accrued interest to March 15, 1941, will become due and payable on that date at the Bankers Trust Co., 16 Wall St., New York, N. Y.

W. S. Richardson, general sales manager of the mechanical division, has announced several changes in its sales staff. A. W. Doran has been assigned to special duties in connection with railroad and governmental sales. B. E. Silver, division sales representative in Indiana, was transferred to government sales in Washington, D. C., and W. E. Nees appointed to his former post, with headquarters in Indianapolis. Ralph Barcus, of the Akron district staff, succeeds Mr. Nees in the West Virginia territory, with headquarters in Charleston.

Dr. Howard E. Fritz, head of the Koroseal Division, in an address at Montreal, P. Q., on January 29, before the technical section of the Canadian Pulp & Paper Association, in which he dealt with synthetics, said that in tests against mustard gas some of the synthetics had been found superior to the best rubber compounds, while fabrics treated with these substances had been proved many times more resistant to hydrogen gas diffusion than rubber-coated fabrics. Chemists, chemical engineers, and technologists, he declared, were speeding up research for substitutes which not only had all of rubber's vital qualities, but even exceeded them in many services.

Personnel Mention

John L. Collyer, Goodrich president, recently was elected a trustee of Cornell University, Ithaca, N. Y., for a term expiring in June, 1945. Mr. Collyer, who was graduated from the Cornell college of engineering in 1917, was an outstanding crew star there.

Charles Wessbecher, Goodrich salesman in New York, in 1940 sold 32,250,000 tires for use on some 8,062,000 toy planes, trucks, tractors, and other play vehicles. It is true that these tires are miniatures, and in size, construction, or method of manufacture do not resemble the tires for automobile, airplane, or industrial uses, but 32 million tires for eight million wheeled toys is a noteworthy business for one salesman.

New Koroseal Paint

Koroplate, a new grade of Koroseal paint developed by Goodrich, when thoroughly dry, is said to be extremely resistant, at room temperatures or slightly above, to the action of fumes and vapors from acids, alkalies, and salts, and it also resists all acids except concentrated formic and acetic. Koroplate is not affected by brass,

chrome, nickel, cadmium, zinc, copper, silver or tin solutions. Such solutions are not contaminated or fouled by the thoroughly dried paint although it is not recommended for constant immersion in liquids.

This new paint, made only in semi-glossy black, is liquid at room temperatures and needs no heating before applying. It can be brushed or sprayed, and thinners can be added where required. It must be used in conjunction with a Koroseal primer with similar characteristics.

Successful applications to date include use on underground pipe and for painting fume ducts in plating rooms.

Duramin Age Resister

Duramin, described as a secret combination of age resistors stemming from non-accelerating aldehyde-amine condensation products,¹ was announced last month by Mr. Collyer. The creation of Duramin, said to have been made possible by carefully selecting and combining the most effective age resistors, resulted from a protracted research effort, participated in by Waldo L. Semon, Webster N. Jones, and W. C. Geer.

Duramin, which will be used in the firm's 1941 Silvertown tire line and certain types of mechanical goods, is said to be effective in both natural and synthetic rubber. The new product makes possible a new special ply now being built into new truck tires that results in less heat build-up and greater heat resistance, it is claimed; while in the Seal-O-Matic tube it prolongs the sealing characteristics of the sealing member. In announcing Duramin, Mr. Collyer described it as "an important research contribution for conserving supplies of natural rubber."

¹ EDITOR'S NOTE. Non-accelerating aldehyde-amines have been used as antioxidants on a large scale in the rubber industry for a number of years, and a large number of patents have been issued on this subject.

Wilson Rubber Co. Celebrates Silver Jubilee

In 1916, Fred J. Wilson, John S. Willis, and Wendall Herbruck formed the Wilson Rubber Co., to manufacture all types of rubber gloves. With Mr. Willis as president, Mr. Wilson, a former rubber company executive, as vice president and general manager, and Mr. Herbruck as secretary-treasurer, the new concern leased the second floor of a small building in Canton, O., and in September, 1916, with ten employees began making surgical gloves. A year later more working space was required; so ground was broken for a new plant, and in the Spring of 1918 the company moved into its own factory with doubled capacity. The building, on the site of the present Wilson Plant No. 1, was of brick, three stories high and covered 50 by 120 feet. By this time the firm had increased operations to include household and electricians' gloves, adding acid and industrial gloves a short time later. With these developments it once more became necessary to increase

working space, and in 1919 a second three-story unit was completed, and in 1921 a third addition was made.

The next year Mr. Wilson was elected president and Karl Herbruck joined the company as treasurer and assistant general manager. Sales continued to grow, and in 1925 a six-story unit 100 by 50 feet was finished, thus making the Wilson Rubber Co. one of the largest manufacturers of rubber gloves, a position it holds to this day. With the domestic glove business well established the company then developed the export trade and now has direct sales connections with the world's larger glove markets.

By 1927 this world demand had placed a severe strain on the company's production facilities, and the fire hazard, always present in the rubber glove industry, before the advent of latex, made it desirable to decentralize the plant. Consequently the company purchased the factory formerly occupied by the Republic Rubber Co. in Canton, thus doubling the capacity. This structure, Plant No. 2, at present is devoted exclusively to the production of latex gloves. Wilson was one of the first to adopt this, the first radical change in glove manufacturing in 40 years. The Wilson Rubber Co. has developed many improvements, including the pure gum center in linemen's gloves and curved finger styling. The firm's complete line now includes surgeons', household, electricians', acid, and obstetrical gloves, finger cots of all types, drainage tubing, dilator covers, and kindred items. From the beginning all sales have been handled through jobbers, and all sales to hospitals and drug stores are made through these mediums. The Wilson Rubber Co. also is proud of the fact that by far the greater number of original dealers still are doing business with the company.

Firestone Announcements

The Firestone Tire & Rubber Co., Akron, recently held its annual meeting at which all directors were reelected, including John W. Thomas, Harvey S. Firestone, Jr., John J. Shea, Lee R. Jackson, Harris Creech, Stacy G. Carkhuff, Bernard M. Robinson, Harvey H. Hollinger, and Russell A., and Leonard K. Firestone. At the board meeting all officers of the company were reelected: President, Mr. Thomas; vice presidents, Mr. Firestone, Jr., Mr. Jackson and James E. Trainer; secretary, Mr. Carkhuff; treasurer, Mr. Shea; assistant secretary, Mr. Robinson; assistant treasurers, Ralph S. Leonard and William D. Zahrt; comptroller, Mr. Hollinger; assistant comptrollers Timothy F. Doyle and Laurence A. Frese.

In commemoration of the building of the first tire at Firestone's Memphis, Tenn., plant four years ago, company executives recently visited the factory and inspected its production and distribution facilities. Visitors included Messrs. Thomas, Firestone, Jr., Shea, Jackson, Creech, Carkhuff, Robinson, Hollinger, and Trainer. Raymond C. Firestone, head of the plant, was host.

After luncheon, attended by civic and industrial leaders, at which Mr. Thomas was a speaker, the group visited three Firestone retail stores and toured the city. Dinner was at the home of Mr. Firestone.

Among the district managers who attended this three-day sales conference were: C. H. Rudy, operating manager, Southeast Zone; J. L. Lyne, St. Louis district manager; H. J. Scott, Jacksonville district manager; H. G. Cantrill, assistant to Southeast Zone manager; G. W. Mulholland, Southeast Zone truck tire representative; J. E. King, Birmingham district manager; W. C. Harris, Atlanta district manager; J. E. Davis, Southeast Zone manager; V. D. Kniss, head of truck and tractor tire sales department; H. L. Hoke, Allied Line Sales; P. L. Moore, Memphis district manager; A. W. Smith, credit manager, Southeast Zone; J. K. Miller, Jr., Charlotte district manager; F. P. Bryant, credit manager, Birmingham district; R. W. Thorburn, sales promotion, Memphis.

Mrs. Ray Austin Graham, only daughter of the late Harvey S. Firestone, died on February 12 of a streptococcus infection. Besides her mother and five brothers she is survived by her husband and a child.

The Goodyear Tire & Rubber Co., Akron, has selected Hayden W. Shively as assistant manager of government sales and aeronautics. For a decade he had been managing director of Good-year Orient, Ltd., rubber buying company at Singapore.

Robert E. Fulton recently was named general auditor at Goodyear, reporting to P. E. H. Leroy, vice president in charge of finance.

Goodyear in its recent annual statement disclosed that domestic payrolls for 1940 were more than \$4,600,000 higher than in 1939 and an average of

2,200 more persons were employed in factory operations. The company's plantations shipped to the parent organization 14,732 long tons of crude rubber last year, contrasted with 9,821 long tons the year before, thus producing a profit of \$1,205,000, after absorbing \$1,411,000 income and defense taxes paid to the Netherlands Indies Government.

The Timken Roller Bearing Co., Canton, O., has transferred to the home office F. H. Lindus, who will engage in general sales promotional work. He is succeeded in his former post of Los Angeles branch manager in charge of the Service-sales Division by L. J. Haderman, branch manager of the division at Chicago, which position is now filled by Jack Gelomb, formerly Detroit manager of the division. Transferred to the Detroit managership is Joe Jessep, resident salesman in the Portland, Ore., branch.

Head of Purchasing Agents

George E. Price, Jr., president of the National Association of Purchasing Agents, has been with the Goodyear Tire & Rubber Co., Akron, since 1922, when he became assistant purchasing agent. In 1936 he was made purchasing agent and as such directs the company's purchasing activities in its various operations in its plants throughout the United States. When the Wolverhampton, England, plant was built, Mr. Price spent a year there supervising construction materials and equipment and organized the purchasing department. Prior to joining Goodyear, Mr. Price, who is an alumnus of New York University, for nine years was purchasing agent at the Davis Bournville Co., Jersey City, N. J.

This executive is also a founder of the New York Purchasing Agents Association, started 27 years ago and two years



George E. Price, Jr.

before the N. A. P. A., of which he was an organizer and has been a director for the past two years. In 1922 Mr. Price formed the Akron chapter of the national association and for two years was head of the local group. Also he was national vice president for the Ohio District, N. A. P. A., in 1925-26 and again in 1939-40.

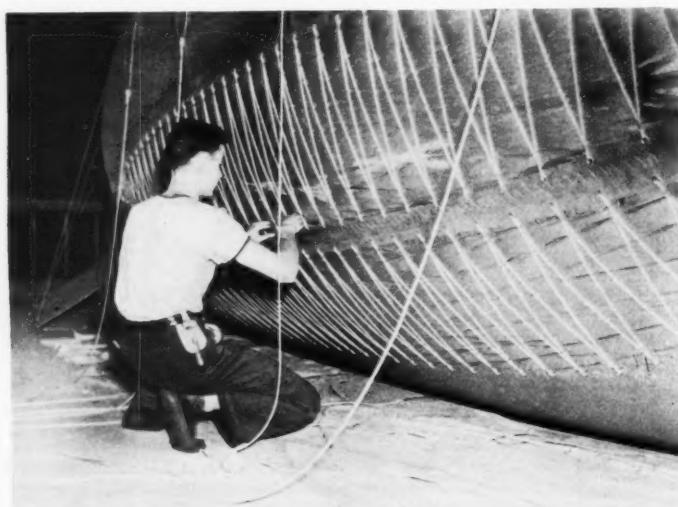
He is, furthermore, a major in the United States Army Reserve, Quartermaster Corps, and is assigned as War-time Procurement Officer of automotive equipment at the Akron District Office, under the Assistant Secretary of War. He is past president of General Dick Chapter, Reserve Officers Association, and at present is a vice president for the District of Ohio.

He is married, and his son Robert is a student at Colgate University.

Seiberling Rubber Co., Akron, has appointed a new dealer in Cuba, Muzelle, S.A., in Santa Clara. The Havana distributor is the firm of Ledo-Rojas, S.A.

Seiberling recently added the following to its extensive line of tires for delivery, transport, and cartage work: heavy-tread truck and bus tires, Nos. 22, 28, and 34, all 10-ply, and Nos. 40 and 42, 12-ply; and mud-and-snow truck and bus tire No. 750-16 C.S. in 6- and 8-ply construction.

L. Albert & Sons is working to capacity on defense orders at its three plants at Trenton, N. J., Akron, O., and Los Angeles, Calif. At the Akron plant a new 1,000-ton hydraulic press is being installed to make high-speed steel driving wheels for federal work. This plant, started a half century ago on a small scale, is now the largest of the three factories. The Albert company, which this year is celebrating its fiftieth anniversary in new and rebuilt rubber machinery, is rushed with orders for the rebuilding of presses for gas masks, bullet-proof tubes, shell cases, and other equipment which is needed in defense work.



One tested form of protection against aerial bombardment is the barrage balloon, and a workman in the factory of the Goodyear Tire & Rubber Co., is shown assembling a balloon of this type for experimental use by the U. S. Army. Goodyear has constructed more than one thousand observation, kite, and other balloons.

MIDWEST

Wider Use of Plastics to Conserve Needed Metals

Plastics research engineers and chemists of Monsanto Chemical Co., St. Louis, Mo., on February 16 were placed at the disposal of executives of metal-consuming industries to assist in breaking the bottlenecks caused by shortages of various essential defense metals such as aluminum, magnesium, and zinc, President Edgar M. Queeny announced.

"In anticipation of growing shortages of essential metals because of necessary diversions into defense production," he said, "we are making available increased capacities in the manufacture of Lustron and Resinox plastics molding materials so that metal-consuming industries can substitute these materials and alleviate some of the pressure now developing in essential metals. This is in line with the suggestion of Defense Commissioner Edward R. Stettinius, Jr., that non-defense manufacturers use substitute metals or plastics wherever possible.

"There are ample supplies of plastics compounds or the raw materials from which they are made so that even abnormal demands can be satisfied quickly. Plastics can be successfully used to replace cast or stamped metals in a wide variety of large-scale uses. An excellent example is the growing use of molded plastics for housings of all types, notably for scales, business machines, radios, vacuum cleaners, and other appliances. Plastics also have replaced metals in kitchen utensils, flashlight cases, measuring scoops, camera cases, automobile parts, and many other consumer goods items which have used sizeable quantities of strategic metals.

"One way in which plastics can replace large areas of thin gage aluminum and steel so badly needed for the increased production schedules for aircraft is in mechanical refrigerators, several builders of which now are introducing new models in which broad application of molded plastics for freezer doors, panel and drawer fronts, knobs, and control panels has been adopted."

Thirty-one rubber concerns in the Midwest recently paid 16,797 employees \$462,000 in wages, gains, respectively, of 4% and 13.3% over the previous month.

The Association of American Battery Manufacturers, Inc., will hold its spring meeting on May 22 and 23 at the Hotel Statler, Detroit, Mich. The Association also is preparing a series of six Battery Service Bulletins, to explain the most elementary principles of storage batteries and instruct dealers on the proper servicing of this equipment. Titles follow: (1) "The ABC's of Specific Gravity" (published December 1, 1940); (2) "Filling Batteries—How and When to Do It" (February, 1941); (3) "Charg-

ing—Proper Steps to Follow" (scheduled for April, 1941); (4) "Sell the Proper Capacity" (June, 1941); (5) "Fundamental Reactions within the Battery" (August, 1941); (6) "How and Why They Wear Out" (October, 1941). Those interested in securing copies should communicate with the AABM commissioner, V. L. Smithers, 2706 First-Central Tower, Akron, O.

The DeVilbiss Co., manufacturer of spray painting equipment, exhaust systems, air compressors, and hose, Toledo, O., recently opened in its new building at 1280 W. Washington Blvd., Chicago, Ill., a new sales and service branch.

The Dow Chemical Co., according to J. W. Crosby, of the development department of Thiokol Corp., Trenton, N. J., is erecting a new factory unit at Midland, Mich., which will double capacity for the production of "Thiokol" and thus take care of the increased business resulting from government defense work. Operations in the new unit are expected to start about March 15.

NEW ENGLAND

Farrel-Birmingham Co., Inc., Ansonia, Conn., in its "Management's Annual Report of Operations to Employees and Stockholders—1940" gives a breakdown of how its sales dollar was spent. The two types of disbursements are: (1) payments to suppliers and (2) payments to employees and stockholders. The percentages of disbursements follow: suppliers of raw materials, fuel, transportation, etc., 35.3%, government taxes, 8.8%, replacements, 2.3%, totaling 46.4%; and the 53.6% left for payment to employees was distributed as follows: factory workers, 37.2%, engineering and office employees, 6.5%, executive officers, 1.2%, totaling 44.9%, which, when added to the aforementioned 46.4% (91.3% in all), leaves 8.7% as a reserve for future contingencies and payment to stockholders.

Taxes of all kinds in 1940 were 72% more per sales dollar than for the ten-year average, 1931 to 1940 inclusive. The fast rising trend is shown by the following statistics: (1) 1931 to 1935 average taxes were 3.37% of sales; (2) 1936 to 1940 average taxes were 5.89% of sales; (3) 1940 taxes were 8.8% of sales.

The American Wringer Co., Inc., Woonsocket, R. I., according to President Harold T. Merriman, has revised its group program, adopted in 1929, to include life insurance totaling \$420,000 for approximately 425 workers employed in its Woonsocket plant and at its two associated organizations in Farmham, P. Q., the American Wringer Co. of Canada, Ltd., and the St. Lawrence Rubber Co., Ltd. The whole plan is being underwritten by the Metropolitan

Life Insurance Co., One Madison Ave., New York, N. Y., on a cooperative basis whereby the employees contribute fixed amounts and the employer bears the balance of the entire net cost. Under the present arrangement employees receive life insurance ranging from \$500 to \$1,000, and \$1,000 accidental death and dismemberment insurance. In case of sickness or non-occupational injury workers will be paid \$7 to \$10 a week. The plan also includes visiting nurse care and the distribution of pamphlets on health conservation and disease prevention.

Ralph B. Symons resigned as rubber chemist of Canada Wire & Cable Co., Ltd., Toronto, Ont., to accept, on February 17, a similar position with the Firestone Rubber & Latex Products Co., Fall River, Mass.

Pilot Plant for Deresinating Guayule

George H. Carnahan has authorized the statement that Intercontinental Rubber Co. is now operating its factory at Salinas, Calif., for the extraction of guayule rubber from cultivated shrub raised at that point. The output is about 10,000 pounds per day of finished dried rubber. This campaign, which was started the first of February, is expected to continue until about the middle of March. The company is reserving most of its matured shrub as a source of seed supply from its selected varieties for which there may be emergency demand.

There is now nearing completion at the Salinas factory a pilot plant capable of producing about 200 pounds per day of deresinated guayule rubber grown and milled in California. This operation is in response to an insistent demand for samples of deresinated guayule rubber in sufficient quantity for comprehensive testing in which rubber manufacturers rather have demanded an interest because of the present emergency and also to enable them to ascertain any special value or use that deresinated guayule rubber may have in their operation.

CANADA

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., has appointed as Quebec division manager Frank H. O'Connor, for 25 years in the company's sales division, traveling mostly in eastern Canada.

Alfred Randolph Caldwell, 47, who had charge of the Goodyear customs department and later became a customs consultant, died in Toronto, February 8, after a brief illness. He was a native of Halifax, Nova Scotia, and started his business career in a shipping line there.

Goodrich Wage Bonus

The B. F. Goodrich Co. of Canada, Ltd., Kitchener, Ont., the beginning of February put into effect a wage increase of $2\frac{1}{2}$ ¢ an hour for men and $1\frac{1}{2}$ ¢ for women and boys, in the form of a temporary wartime bonus to cover the rising cost of living. But officials of the Goodrich United Rubber Workers of America, Local 73, claiming that the increase is meant to overcome their request for a 5¢-an-hour raise, rejected "this small bonus" because it is insufficient to cover higher living costs and because the union feels there should be no difference in the bonus between men employees and women and boys.

Later the Goodrich management agreed to meet the negotiating committee of Local 73 to discuss requests by Kitchener plant employees for the 5¢ increase, a better seniority plan, and more remuneration for night workers.

Goodrich officials stated the temporary wartime bonus is in keeping with a government order-in-council enacted December 16, which suggested that employers adopt a bonus system whereby wages could be kept in line with the cost of living. The bill is also designed to keep wages at a fair level and prevent unjustified increases which would bring about major increases in living. A company official said consideration was given to the government proposal immediately after it was enacted. He said the bonus was determined on the increased cost of living as recorded in the government "total index living costs" since the last wage adjustment in December, 1939. This table is prepared by the Dominion bureau of statistics.

The company intends to make wage adjustments whenever the living costs, as recorded in this table, advance or decrease 5%. The government table records an increase of 5% since December, 1939, with the result an adjustment went into effect the first of February. As this is only a temporary wartime bonus, if the cost of living were to drop 5%, the bonus would be discontinued.

Goodrich, through G. W. Sawin, vice president and general manager, has announced the appointment as controller of D. G. Seebach, chief accountant for the past twelve years.

The Dominion Department of Munitions and Supply, Ottawa, Ont., recently awarded contracts to the following: British Rubber Co. of Canada, Ltd., Montreal, P. Q., \$7,745; B. F. Goodrich Co. of Canada, Ltd., Kitchener, Ont., \$29,438; Kaufman Rubber Co., Ltd., Kitchener, \$92,034; Dominion Rubber Co., Ltd., Montreal, \$641,935; Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., \$154,680; Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, \$481,225; Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., \$107,617; Northern Rubber Co., Ltd., Guelph, Ont., \$34,358; Miner Rubber Co., Ltd., Granby, P. Q., \$13,125; and Canadian General Rubber Co., Ltd., Galt, Ont., \$48,911.

OBITUARY**Stephen W. Bourn**

A SUDDEN heart attack on January 26 caused the death of Stephen Wentworth Bourn, of the noted pioneer rubber family of Rhode Island. He was born in Bristol on April 15, 1877. During his early youth he attended private schools and also was educated by tutors in Rome, Italy, where his father, Augustus O. Bourn, who later became governor of Rhode Island, was consul general of the United States from 1889 to 1893. Upon the return to America young Bourn went to the English & Classical High School in Providence and then Brown University, graduating in 1899.

In 1900 he became president of the company his father had founded, Bourn Rubber Co., and of Bourn Insulated Wire Co. and subsidiaries. When the plants were sold in 1926, Colonel Bourn retired from active business. He had also owned an independent wire and cable factory and had perfected several inventions relative to making rubber boots and insulated wire and cable.

For many years the deceased was a colonel of the Bristol Train of Artillery and during the World War had been a major in the Rhode Island National Guard. He also belonged to Psi Upsilon fraternity and the University, Rhode Island Country, and Army and Navy clubs.

He leaves two sisters.

Funeral services were held on January 28 at Swan Point Cemetery, Providence.

John J. Burke

JOHN J. BURKE, since 1927 manager of New York General Tire Co., 835 Eleventh Ave., New York, N. Y., died of a heart ailment in a Brooklyn hospital on January 29. For a year from its organization in 1926 he had been president of the Raritan Rubber, Inc., tire manufacturing concern in New Brunswick, N. J., and for 10 years prior to that Mr. Burke had handled the sale of solid tires for the Kelly-Springfield Tire Co. and the Firestone Tire & Rubber Co. in the New York metropolitan area.

The deceased was born in Troy, N. Y., 51 years ago.

He leaves his wife, two sons, and two daughters.

John Kroeger

LAST month John Kroeger, an expert in belt manufacture, died. For ten years he had been with the Diamond Rubber Co., Akron, O., then in 1913 had joined the mechanical goods division of The Goodyear Tire & Rubber Co., Akron. Later he was sent to Sydney, Australia, to open up the mechanicals division at the Goodyear plant there. He leaves a brother, also a Goodyear employee.

Clifford S. Johnson

CLIFFORD S. JOHNSON, of the development department staff of the Naugatuck Chemical Division of United States Rubber Co., passed away at his home in Naugatuck, Conn., on February 5 after a short illness. From 1923 to 1929 he had been employed by the Miller Rubber Co., Akron, O., and then joined U. S. Rubber at its General Laboratories in Passaic, N. J. In 1930 he was transferred to Naugatuck Chemical. His early work was concerned with reclaiming rubber, but for the past eight years Mr. Johnson was engaged in development work in the field of latex compounding and applications.

A native of Chicago, Ill., (August 3, 1897), the deceased was graduated from Curtis High School and the University of Chicago (1923). He belonged to the Adoniram Lodge No. 517, F. & A. M.

He is survived by his wife, his mother, and two brothers.

Funeral services were held at his late residence on February 8. Interment was in Naugatuck.

Richard H. Gillespie

RICHARD HENRY GILLESPIE, president of the Stamford Rubber Supply Co., Stamford, Conn., and editor of the *Stamford Advocate*, died in Stamford on January 15 after a brief illness. He was born in Stamford in August, 1877, and educated at the local grade and high schools, and, when 18, was employed by the *Advocate*, becoming editor-in-chief in 1923.

The deceased was also treasurer and director of Gillespie Bros., Inc., vice president of the Viscal Co. and of the Fidelity Title & Trust Co., of Stamford, a director of the Stamford Savings Bank, Y. M. C. A., Beaver College, and the Ferguson Library, a member of the Masons, the New England Daily Newspaper Assn., and the Lido Club of Long Beach, N. Y., and a past commodore of the Stamford Yacht Club.

Survivors include his wife, a son, and two daughters.

Waterproof Footwear Inventories Abnormally Low

Stocks of waterproof footwear in the hands of manufacturers at the end of 1940 are the lowest year-end inventory on record, according to a survey by The Rubber Manufacturers Association, Inc. Stocks totaled only 5,497,000 pairs, about seven weeks' supply at the average rate of shipments during 1940. At the close of 1939 the inventory was 9,724,000, 77% higher than the current figure. The average inventory of the three preceding year ends, 1937-1939, was 10,859,000 pairs.

Manufacturers' sales of waterproof footwear in 1940 were 38,784,000 pairs, against 32,520,000 in 1939.

Despite the increased sales in 1940, stocks in the hands of wholesalers and retailers have also been cleaned out and are far below their normal level.

FINANCIAL

FROM OUR COLUMNS

Unless otherwise indicated, the results of operations of the following are after operating expenses, Federal income taxes, and other deductions. Additional tax charges under the new Revenue Act of 1940 have been made against earnings in many reports. Figures in most cases are subject to audit and final adjustments.

Baldwin Locomotive Works, Philadelphia, Pa., including the Midvale Co. For 1940: consolidated net profit, \$1,944,072, or \$1.75 a common share, against \$542,026; consolidated sales, \$51,102,729, against \$31,463,045 in 1939.

Collyer Insulated Wire Co., Pawtucket, R. I. For 1940: net income, \$167,900, equal to \$1.12 each on 150,000 shares of capital stock, against \$33,579, or 22¢ a share, in 1939.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and wholly owned subsidiaries. For 1940: net income, after depreciation, obsolescence, interest, federal taxes, and other deductions, including \$10,000,000 for special contingency reserve, \$86,945,173, equal, after preferred dividend requirements and equity in undivided profits or losses of controlled companies not wholly owned, to \$7.23 a common share, against \$93,218,664, or \$7.70 a common share, in 1939; net sales, and other operating revenue, \$359,055,655, against the previous high of \$298,833,238 in 1939; federal taxes, \$47,437,000, against \$14,050,000.

Electric Auto-Lite Co., Toledo, O. For 1940: net profit, after all charges, \$6,001,718, equal to \$5.01 a common share, against \$5,653,839, or \$4.72 a share, in 1939; sales \$72,973,177, against \$56,346,033; taxes, \$5,313,381, against \$1,698,551.

Electric Storage Battery Co., Philadelphia, Pa. For 1940: consolidated earnings, after costs, depreciation, federal income taxes, and other charges, \$2,167,591, equal to \$2.39 each on 907,810 shares of combined preferred and common stocks, outstanding, against \$1,820,661, or \$2 a share, in 1939.

Flintkote Co., New York, N. Y., and subsidiaries. For 1940: net income, after federal, state, and foreign taxes, \$1,436,550, equal to \$2.10 each on 685,196 shares of stock outstanding, against \$1,432,383, or \$2.11 each on 677,546 shares, in 1939; net sales, \$19,897,748, against \$17,164,148.

General Motors Corp., Detroit, Mich. For 1940: net income, after income and excess profits taxes and subject to final audit, \$195,500,000, or \$4.32 a common share, against \$183,290,222, or \$4.04 a common share, in 1939, taxes on income, \$125,100,000, against \$44,852,190.

The B. F. Goodrich Co., Akron, O. For 1940: consolidated net profit, after provision for depreciation, interest, and

50 Years Ago—March, 1891

Imports of India rubber and gutta percha, crude, by the United States during the calendar year 1890 amounted to 34,606,171 pounds, valued at \$16,719,608, or an average of 45.6¢ per pound. (p. 148)

Only about ten tons of gutta percha per year are imported into this country, that being used for cable and cement purposes. (p. 158)

In 1866 Henry George Tyer began the manufacture of druggists' rubber goods in Andover, Mass., under his own name. Ten years later he organized the Tyer Rubber Co. (p. 155)

A new firm, the Crescent Insulated Wire & Cable Co., Trenton, N. J., is making a new style of insulation, having the control of a process for weaving a glass insulation over the conductors. (p. 157)

The largest biscuit ever brought from Para to this country weighs over 1,000 pounds, the largest heretofore weighing only about 300 pounds. (p. 161)

Travellers who have penetrated into the forests on the borders of Lake Mataguia, Mexico, report large numbers of rubber trees that have never been tapped. (p. 163)

The dearth of rubber caused by the exhaustion of some of the principal sources of supply has led to the serious consideration of rubber culture in Ceylon.

taxes, \$6,104,993, equal, after dividends on the \$5 cumulative preferred stock, to \$3.10 each on 1,303,255 common shares outstanding, against \$6,628,746, or \$3.50 a common share, in 1939; consolidated net sales, \$145,347,775, against \$135,735,562; federal income taxes, \$2,215,000, against \$1,200,000. Accounts of certain subsidiaries in belligerent countries were not included in either year.

Goodyear Tire & Rubber Co., Akron, O., and subsidiaries. For 1940: net profit, after depreciation, interest, subsidiary dividends, federal income taxes, and \$1,000,000 reserve for contingencies, \$10,309,788, equal, after dividend requirements on the \$5 preferred stock, to \$3.44 each on 2,059,168 common shares, excluding 2,288 shares in the treasury, contrasted with net profit of \$9,838,797, or \$3.20 a common share, in 1939; net sales, \$217,540,079, against \$200,101,704; current assets, December 31, 1940, \$120,313,776, current liabilities, \$22,245,746, against \$109,251,502 and \$17,515,813, respectively, a year earlier.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., and subsidiaries. For 1940: consolidated net income, \$1,391,514, equal to \$11.69 a share on 119,080 preferred shares outstanding and after regular preferred dividends, to

lon. (p. 164)

In 1853 William Christopher, England, made improvements in devulcanizing rubber by macerating it in alkalis, or lime. (p. 173)

25 Years Ago—March, 1916

Even if this country is prepared against invasion, is it prepared to insure an uninterrupted supply of crude rubber? At least three maritime nations stronger than ourselves could stop that flow, even if we were nominally at peace. . . . An American navy, adequate to protect the 30,000 miles of coast line in this hemisphere must be built in the shortest possible time. (From a Report of Rubber Club's Committee on Preparedness.) (p. 285)

The Jones pneumatic tire spring utilizes the principle of a pneumatic cushion in conjunction with the spring of an automobile. (p. 296)

The United States Circuit Court of Appeals on February 15 affirmed the findings of Judge Hunt in the United States District Court, who held that Louis H. Perlman's demountable rim patent (U. S. patent No. 1,015,270) was valid and infringed by the Standard Welding Co. It is estimated that 700,000 of the 1,200,000 automobiles to be constructed this year will use demountable rims. (p. 307)

Goodrich is the only American tire concern with a plant in France. (p. 314)

\$4.25 each on 257,260 common shares outstanding, contrasted with \$1,652,502, equal to \$13.78 each on 119,729 outstanding preferred shares and to \$5.26 each on 257,260 common shares outstanding at the end of 1939; current assets, \$10,385,347, against \$10,073,099; current liabilities, \$1,138,220, against \$1,132,302; net working capital, \$9,247,127, against \$8,940,797; taxes, \$2,503,188, against \$1,291,564.

Mohawk Rubber Co., Akron, O., and subsidiaries. For 1940: net income, \$66,845, equal to 47¢ each on 141,638 shares of common stock, against \$301,782, or \$2.23 a share on 135,302 common shares, in 1939; net sales, \$2,414,033, against \$3,177,997.

New Jersey Zinc Co., New York, N. Y. For 1940: net income, after deductions for depreciation, depletion, contingencies, and federal taxes, \$8,236,815, equal to \$4.19 each on 1,963,264 capital shares, against \$5,299,055, or \$2.70 a share, in 1939.

Philadelphia Insulated Wire Co., Philadelphia, Pa. For 1940: net loss, \$24,126, against loss of \$68,538 in 1939.

Raybestos-Manhattan, Inc., Passaic, (Continued on page 88)

BRAZIL

Rubber Seeds Flown to Belem

In connection with the Brazilian Government's efforts to stimulate rubber cultivation, a group of United States Department of Agriculture scientists arrived in Brazil last December. They are to cooperate with the Brazilian Ministry of Agriculture in the matter of soils, sites, types of trees, defense measures against pests, disease, etc.

On February 4 three United States Army bombers flew from Balboa, Canal Zone, with 204,000 selected rubber seeds for Brazil and arrived at Belem, February 6, the U. S. Department of Agriculture announced. The seed, collected from high-yielding clones grown in the Philippines, was shipped to Balboa by boat, but missed connections there for Brazil. Upon the request of the Department of Agriculture, to prevent deterioration of the seed through excess time in transit, the War Department used the bombers to deliver the seed. At Belem the seed was delivered to the Instituto Agronomico de Norte, which is cooperating with the U. S. Department of Agriculture and the Latin American Republics in investigating the feasibility of extended rubber growing. The seed will be tested for resistance to the leaf blight disease prevalent in many parts of Latin America.

About two months ago the United States Department of Agriculture shipped 100 budded stumps from high-yielding blight-resistant strains of rubber to the institute.

Notes

Reports from Brazil indicate that rubber manufacturers are demanding that the government curb exports of crude rubber in order to assure an adequate supply for domestic consumption, which has been steadily increasing and is set at 6,000 tons for 1941. Annual production in the country is estimated at 16,000 tons, and 1939 exports totaled 12,000 tons, with the figure growing to meet defense needs in other nations. Particularly annoying to local manufacturers was the statement that Japan is buying large shipments for Germany, the latest a 1,000-ton order awaiting a Japanese vessel. Brazil at present has three tire factories, one each of the Goodyear Tire & Rubber Co. and the Firestone Tire & Rubber Co. in Sao Paulo and one in Rio de Janeiro under the technical direction of the Seiberling Rubber Co.

Sociedade Mecanica Para a Industria e Lavoura, known as the Somil, with offices in Rio de Janeiro and S. Paulo, it is reported, has established a model factory for making belting of fabric and rubber. The equipment is said to include a continuous vulcanizing press built in Brazil. Belting made up of several plies and 45 centimeters wide and 150 meters long can be produced on the press at present.

EUROPE

GERMANY

Bullet-Proof Gasoline Tanks for Planes

German airplanes carry gasoline tanks of special construction which are said to make them bullet-proof. According to official information issued in England about tanks found on German airplanes recently brought down, the tanks are built up of several layers of different materials, as follows: There is an outer covering of black vulcanized rubber $\frac{1}{4}$ -inch thick, then a layer made up of from one to five very thin sheets of yellow untreated rubber; next comes yellow raw rubber bonded to grey crepe rubber $\frac{3}{8}$ -inch thick; finally is the actual con-

tainer of an unspecified fiber. No synthetic rubber at all appears to have been used in the construction of the tank, which leads to the supposition that the German synthetic rubber lacks the self-sealing properties of natural rubber.

The Spenker Tire

From the United States Department of Commerce we have obtained the details and diagram, given below, regarding the Spenker air-cooled solid tire,¹ which were released by Alfred Spenker to the German technical press on November 19, 1940.

As the diagram shows, the tire is essentially of solid construction with a series of air cooling channels that terminate at the outer tread and communicate with other metal channels in the wheel rim. A floating air-suction head, located at the hub of the wheel and from which the cooling channels lead, is said to be the most important part of the invention. The suction head, which does not rotate with the tire, is held in a horizontal position, when the wheel is running, by means of a small vane. Tests have shown that more effective cooling is obtained when the suction head points to

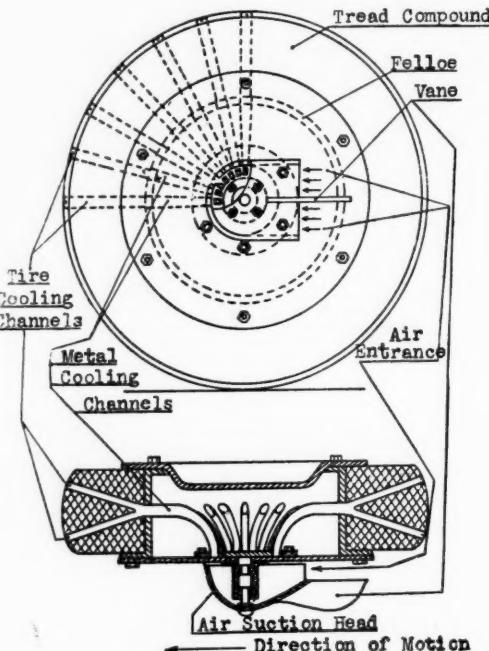


Diagram of the Spenker Tire

the rear, i.e., in the direction opposite to the travel.

Cooling action depends upon the rapid transfer of air by means of centrifugal force. The air enters the suction head, rushes through the channels, and is emitted from the tire at the periphery of the tread, carrying the heat generated by the tire. It is claimed that the cooling effect measurably exceeds the heat generation in the tire and that the tire operates the lower temperatures with increasing speeds.²

Temperature measurements were taken on a Spenker tire under test at a speed of 80 kilometers per hour and with a load of 750 kilograms. Without the air-suction head and after a running time of 60 minutes, the temperature at the surface of the tire was 102° C. and in the radial channel, 233° C. With the air-suction head and after a running time of 180 minutes, the temperature at the surface was 67° C. and in the radial channel, 70° C.

The use of a soft rubber compound, together with the cooling channels, is said to insure a high degree of resiliency for the tire. In addition to keeping the tire safe from the deteriorating effects of heat, the invention will result in the use of less rubber, a tire for a 2½-ton truck being reduced 10 to 15 kilograms, according to Mr. Spenker.

¹ INDIA RUBBER WORLD, Feb., 1941, p. 73.

² Gummi-Ztg., Dec. 6, 1940, p. 898.

Bleaching Latex

Hitherto it has been thought that to obtain satisfactory light-colored or transparent goods directly from latex it was necessary to treat the latex immediately to prevent darkening or discoloration by sediment. This was accomplished by adding some reductive oxygen compound of sulphur or its salts, as hydrosulphite of soda, to the latex before the discoloring products were formed, since it was believed that once they were present, their undesirable effect could not be remedied by subsequent bleaching. However the Metallgesellschaft A.G., Frankfurt a.M., claims¹ to have succeeded in treating ordinary and concentrated latices after the sediment has already been formed. The firm adds reducing agents, preferably such as are used to bleach sugar cane juices, for instance hydrosulphite of soda, potassium metabisulphite; sodium bisulphite, the combination of sodium bisulphite with formaldehyde or the combination of formaldehyde with hydrosulphite of soda, to the latex in the proper proportions, in accordance with the purpose for which the latex is to be used. Zinc sulphite may also be used as reducing agent. The treated latex is then employed in the usual way for making dipped goods, etc. This method, it is claimed, makes possible using latex hitherto classed as inferior, in exactly the same way as what is usually termed first quality latex.

¹ D. R. P. 698,662.

Notes

The works of the former Polish rubber company, Pepege at Graudenz, have been acquired by the Graudenz branch of the Radium Gummiwerke m.b.H., Kolin-Dellbruck. The concern, working with a capital of 1,200,000 marks, is to manufacture and sell all kinds of rubber goods and allied products.

The Hessische Gummiwarenfabrik Fritz Peter A.G., Klein Auheim, will raise its capital by 200,000 marks. The capital now is made up of 600 shares of 1,000 marks each.

The directors of the Gummiwarenfabrik G.m.b.H., Leipzig, have decided to liquidate the concern, and Karl Ries, of Leipzig, has been appointed liquidator.

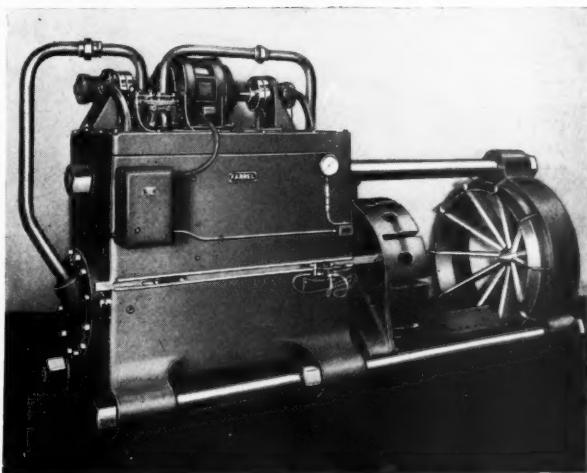
The Leipzig Spring Fair of 1941 will be held the first week of March as usual. It is reported that the interest already shown in it promises that this Fair will be as successful as its 1940 predecessor when 6,615 exhibitors, including 354 from foreign countries, participated. There had been 115,167 visiting merchants including 5,432 foreign merchants at the 1940 Fair, and sales grossed about 500,000,000 marks.

A press report from Tokyo indicates that the Mitsui concern, in collaboration with I. G. Farbenindustrie A.G., Frankfurt a.M., Germany, will conduct a large-scale research program on synthetic rubber, synthetic oil, and artificial dye-stuffs, and results will be made public when feasible. Mitsui will soon greatly expand its chemical laboratory at Meguro, and an annual expenditure there of about ten million yen is expected on research developments.

GREAT BRITAIN**Great Interest Now in Synthetic Rubber**

The war is bringing home to the British as never before the importance of synthetic rubber, which now is receiving unusual attention. In an address on "Substitute Materials," delivered in Dundee last December, Dr. F. W. K. Wynne-Jones, professor of chemistry at University College, Dundee, pointed out that Germany had been occupied with the problem of producing synthetic rubber since 1910; that America was also giving it much attention, but that Great Britain lagged behind. This policy was short-sighted, he said, for though synthetic rubber might be an uneconomic proposition today, this might be far otherwise in 10 to 20 years' time. Britain and Holland, he added, now controlled practically all the world's plantations, but, he warned, if the British do not get to work on synthetic rubber and do not study how ordinary

FARREL-BIRMINGHAM RUBBER BALE CUTTER



*Loads Easier
Operates Faster
Increases Output*

For quick and easy loading, the Farrel-Birmingham Rubber Bale Cutter is designed with three tie rods, with only one at the top. This provides more free space for charging bales either from above or from the sides.

For faster operation two hydraulic pumps driven by a single motor provide rapid approach to the work and quick return of the crosshead to the starting position. Reduced speed for cutting at high pressure is an additional feature.

Once the stroke is started the cutting cycle is wholly automatic. The ram's motion can be reversed at any point of the stroke. Operation can be made fully automatic and continuous if proper handling facilities are available. Maximum flexibility is thus provided for all conditions of operation.

The result is increased output per machine hour in cutting any kind of baled rubber — tough, soft, frozen or irregularly shaped. The machine has the structural strength to maintain high output under the strain of fast, heavy duty service.

Let us send you full details and specifications.

FARREL-BIRMINGHAM COMPANY, INC.

234 North Cliff St., Ansonia, Conn.

rubber can be improved, there is grave danger of the rubber industry being cut away from them.

In a letter to *The India Rubber Journal*,¹ T. L. Garner, of the John Bull Rubber Co., Ltd., Leicester, discussed the possibility of synthetic rubber becoming a serious rival of natural rubber. Producers of plantation rubber, he said, bank on the low price at which their product can be obtained and the still lower price that increased yields will make possible. Restriction, however, raises costs, and the selling price of natural rubber is now around 1s. per pound, Mr. Garner pointed out, a price which synthetic rubber may be able to meet in a few years' time. He admits that unnatural world conditions are responsible for the search for synthetic rubbers, but these conditions are likely to continue long enough to permit the production of synthetic rubber to become firmly established. If in this time American production, for instance, should reach 100,000 tons annually, or more, then no efforts of the plantation industry would be capable of dislodging synthetic rubber again.

Reorientation of Research Needed in the Far East

F. D. Ascoli, managing director of Dunlop Plantations, Ltd., writing to the *India Rubber Journal*,² concurred with Mr. Garner's opinion regarding the danger of synthetic rubber to natural rubber. The synthetic rubber industry, Mr. Ascoli said, would give manufacturers what the plantation industry has been unable to give—a series of raw materials each specially suited for a particular product. Superior quality and adaptability might be sufficient to induce the manufacturer to pay a higher price. Hence a reorientation of research was essential in order to make plantation rubber so far as is practicable competitive with its synthetic rivals in their specific qualities. The British Rubber Research Association and the Rubber Research Institute of Malaya have recognized the importance of such research work, but the serious interest of planters in this kind of work has not yet been aroused.

"In the 20's research into economy of production was co-ordinated and developed with admirable results," stated Mr. Ascoli. "Research into quality is still more essential in the 40's."

Rubber Export Group

Certain changes have been made in the committees and sectional groups of the Rubber Export Group. The members of the executive committee now are: chairman, Sir Walrond Sinclair; acting chairman, Sir George Beharrell; Col. J. Sealy Clarke, T. J. Cragg, John Cunningham, H. W. Franklin, J. L. Graham, F. R. Green, T. H. Hewlett, E. Jago, Alexander Johnston, L. V. Kenward, R. W. Lunn, C. T. Mabey, Reginald Moseley, Mark Poole, S. T. Rowe, R. G. Soothill; acting secretary, Miss C. Carden.

Standing committee: Colonel Sealy Clarke, F. deF. England, and Messrs. Franklin, Kenward, and Mabey.

Sectional Groups: *Tire Section*, chairman, Sir George Beharrell; *Rubber Proofers' Section*, chairman, Mr. Cragg, secretary, Chas. E. Rogerson; *Rubber Footwear Section*, chairman, Mr. Johnston, secretary, Ivor W. Davies; *Rubber Thread Section*, secretary, D. P. G. Moseley; *Golf, Tennis & Squash Ball Section* and *Rubber Sports Goods & Toy Section*, chairman, P. W. Howard; *General Mechanical Goods Section*, chairman, Reginald Moseley; *Hose Section*, chairman, W. White; *Rubber Flooring Section*, chairman, T. H. Brooke; *Surgical & Latex Goods Section*, chairman, Mr. Franklin; *Belting Section*, chairman, A. W. Fletcher; *Sole & Heel Section*, chairman, R. Thorniley, secretary, P. A. Earle.

Rubber Goods Export

Exports of manufactured goods from Great Britain dropped sharply during the latter part of 1940, in contrast with the steady advance in the early months. Thus shipments in November were valued at only £89,102 against £126,451 in November, 1939. The value of shipments for the first 11

months of 1940 totaled £1,809,065, against £1,270,026 for the same period of 1939. The increase in 1940 values is largely due to the higher prices prevailing during the year; nevertheless it is expected that volume figures of exports for the year will also show an increase as compared with 1939.

EUROPEAN NOTES

On September 10, 1940, France instituted a Central Bureau for Industrial Products. On October 17 a Rubber, Asbestos & Carbon Black Section was formed which controls all raw materials and finished goods of the rubber industry. This section immediately set about fixing the amount of rubber, gutta percha, balata, and unvulcanized rubber sheet that manufacturers would be allowed to use and issued an order on October 18 requiring manufacturers to report the items (and quantity of each) produced in the year ended July 1, 1939. It also banned the sale of cycle tires and tubes until further notice, except in very special cases.

Following German occupation of Belgium the consumption of reclaimed rubber, old rubber, asbestos, and semi-finished rubber products has been reduced to 30% of the average consumption during the last half of 1939. Consumption of crude rubber, latex, and spinning asbestos fiber is prohibited.

According to latest reports the sovietized Baltic States, Lithuania, Latvia, and Estonia, will now use Soviet synthetic rubber exclusively instead of imported natural rubber. Engineers and technological experts will be sent from Russia to instruct manufacturers in the methods of using the synthetic rubber.

According to a United Press dispatch from Moscow, dated February 7 and published in *The New York Times* on February 8, Moscow subway tracks are being laid on rubber absorbers in an effort to soundproof completely the subways.

A selling office has been established in Amsterdam, Holland, for the sale of products made from Mipolam and other new synthetic resins. The new enterprise is known as Verkoopkantoor voor Mipolam Prod. Mipolam, it will be recalled, is a vinyl polymerizate produced in Germany.

The Schionning & Arve Rubber Works, Copenhagen, Denmark, reported profit of 686,000 kroner for the past business year, against 573,000 kroner in the preceding year. With the carry-forward of 50,000 kroner, the amount available for distribution is 736,580 kroner, and it is proposed to pay dividends of 8.33%, against 10% in the preceding year, and to place 449,000 kroner to reserve.

The Finska Gummi A.B., Helsingfors, Finland, will increase its share capital from 70,000,000 to 175,000,000 Finmarks.

Portugal imported 792 tons of crude rubber in 1939 in addition to rubberized fabrics valued at 2,440,000 escudos; tires and tubes, 17,540,000 escudos; sheet, 1,050,000 escudos; and other rubber goods, 3,530,000 escudos. In the same period it produced 188 tons of rubber soles, 57 tons of hose, and 186 tons of other rubber articles.

FAR EAST

MALAYA

Estate Supplies Reduced by the War

The war, by cutting off various estate supplies, is forcing many changes in estate procedure and is giving certain industries a new fillup. Thus the shortage of ply-wood cases, formerly largely obtained from Scandinavia, has concentrated greater attention on the question of baling rubber; at the same

¹ Jan. 11, 1941, p. 26.

² Jan. 25, 1941, p. 64.

time local manufacture of ply-wood cases is no doubt receiving more encouragement; formic acid can no longer be obtained, but adequate supplies of acetic acid are available from Canada, and the latter acid has thus once more become the chief coagulant here. Supplies of sulphate of ammonia for manuring are restricted, and nitrate of soda will have to be substituted. Coagulating and bulking tanks, partitions for tanks, latex chutes and buckets are usually made of aluminum, which, of course, is needed for airplanes and consequently hard to get. Likely substitutes seem to be equipment made of Arniel, a hard rubber product produced in Netherland India where Arniel utensils have been in use for some years. Recently they were introduced into Malaya.

Other supplies which are now short, according to the *Planters' Bulletin* of December, 1940, include centrifuges for concentrating latex—several models in use here were of Scandinavian or German origin; metal gauze for latex strainers, and certain other estate chemicals besides formic acid.

Full Spiral Tapping

In rubber circles, the question of the hour is: "Will Malaya be able to produce the full 100% that has been released for export?" and the answer, by and large seems to be, "Not without drawing on estate stocks and a more general adoption of intensive tapping systems to help overcome shortages in labor." To be sure one can probably count on many native owners tapping their rubber now instead of resting it and selling their coupons, but they will draw tappers from estates and thus further emphasize the shortage of labor that there is on estates.

In connection with the problem the Rubber Research Institute *Planters' Bulletin* for December, 1940, discusses the pros and cons of full-spiral tapping. By this method trees are tapped every fourth day over their entire circumference.

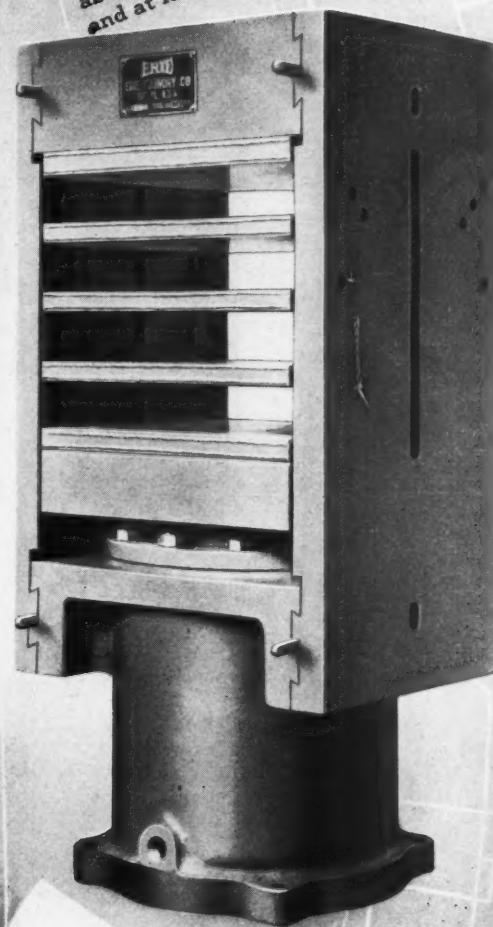
Tapping on the full circumference was first tried in Sumatra in areas scheduled to be replanted, and where, consequently, the aim was to get as much rubber in as short a time as possible before felling the trees. The tapping in this case was carried out daily, and it was found that in this way a normal year's crop could be obtained in three or four months. This gave planters the idea that a full spiral system with suitable resting periods might be good general practice; so experiments in this direction were started on various estates. Many planting companies in Indo-China and a few in Malaya and elsewhere have changed over to full spiral tapping. Reports of results on seedling trees tapped by this method for several years show that yields were 10% more than on half-circumference systems of equal intensity. In one experiment started by the Rubber Research Institute in 1935 and continued to the end of 1939 the increase was 25%. Experiments on budded trees are of more recent date. Results here have varied from considerable increases in the case of some clones to sharp declines in yields in the case of others. Evidently tapping systems must be carefully selected to suit individual clones.

Summing up, it is shown that as compared with other systems of the same intensity, the full spiral system offers the advantages of higher yields, lower costs, and less trouble. However two important objections exist: namely, delayed growth and the possibilities of poor bark renewal. Still it is believed that serious and lasting damage is avoidable if later on suitable resting period and short tapping cuts are adopted, for, of course, the full spiral system is suggested as a temporary measure only. Provided the earlier experiments now going on are carefully watched and their warnings heeded in time, it is thought the damage will not be great. Meanwhile the system will give a good profit and at the same time will help considerably toward producing the 100% allowance and in overcoming a shortage of tappers.

Crude Rubber Exports

During 1940 net Malayan rubber exports reached the record figure of 554,910 tons, against permissible allowance of 538,094 tons, thus showing an excess of 16,816 tons. The 1939 shipments totaled 361,598 tons.

To Your Specifications
When special production problems demand special hydraulic presses, put your requirement up to Erie Engineers... 35 years of experience, designing and building equipment to meet special conditions enables Erie to serve you more efficiently... and at lower cost to you.



This 32" x 32" platen press was specially designed for producing automotive rubber parts and mechanical goods... let us work out the answer to your hydraulic requirement!



ERIE FOUNDRY CO.
ERIE • PENNSYLVANIA



Porcelain Glove Forms

—for dipped rubber gloves, including linemen's or electricians' gloves, surgeons' and household gloves. Some are made from our own stock molds and others from customers' molds.

Write today for our new catalog covering rubber glove and other forms for dipped rubber goods. Prompt attention given to requests for quotations based on your specifications or stock items.

The Colonial Insulator Company

Akron, Ohio, U. S. A.

The CARTER BELL MFG Co



Springfield New Jersey

Editor's Book Table

BOOK REVIEWS

"A.S.T.M. Standards on Rubber Products." Prepared by Committee D-11 on Rubber Products. Published by American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. December, 1940. Paper, 6 by 9 inches, 264 pages. Price \$1.75.

The extensive activity of Committee D-11 during the past year is reflected in the current edition of this book which contains in their latest approved form 34 standardized specifications and test methods relating to rubber products. The 34 standards include five new test methods, one new specification, and 14 previous methods and specifications revised during 1940.

The previous classification has been retained with the standards divided into five sections: general methods; hose and belting; gloves, matting, and tape; insulated wire and cable; and rubber cements, sponge, and hard rubber products. General methods cover: chemical analysis; sample preparation for physical tests; and tests for tensile, aging, adhesion, property changes in liquids, compression-deflection characteristics, compression set, state of cure (T-50), ply separation and cracking, hardness, indentation, and resistance to abrasion and heat, and light checking and cracking. The new standards are: accelerated aging by the oxygen-pressure method; accelerated aging by the oven method; tests for compression-deflection characteristics; tests for physical state of cure; testing of automotive hydraulic brake hose; and specifications for ozone-resistant type of insulation.

In addition to the 34 approved standards, there are four proposed drafts of tests and specifications: test for resistance to accelerated light aging; calibration of light source used for accelerating the deterioration of rubber; test for tear resistance; and specifications for rubber insulating blankets for use around electrical apparatus or circuits not exceeding 3,000 volts to ground. The volume concludes with a nine-page bibliography of important recent publications, divided into appropriate classifications, and a personnel list of Committee D-11.

"Union Policies and Industrial Management." Sumner H. Slichter. Published by The Brookings Institution, 722 Jackson Place, Washington, D. C. 1941. Cloth, 5 $\frac{1}{2}$ by 9 inches, 597 pages. Indexed. Price \$3.50.

This volume, which has grown out of a study begun some years ago, presents a comprehensive discussion on collective bargaining except as it relates to wage rates. The author divides collective bargaining into two principal aspects, designating it as a method of labor price-making and as a method of introducing civil rights into industry. This latter aspect, referred to as a system of "industrial jurisprudence", is the principal concern of this book. The vital issues which surround this subject are set forth in much detail in this volume, and thus it should be of interest and value to union executives, business men, and all students of labor problems.

NEW PUBLICATIONS

"Federal Specification for Rubber Goods; General Specifications (Methods of Physical Tests and Chemical Analyses)," ZZ-R-601a. National Bureau of Standards, Washington, D. C. For sale by the Superintendent of Documents, Washington, D. C. Price 15¢. 44 pages. This new government specification on rubber goods, which supersedes the previous publication of February 4, 1930, becomes effective March 1, 1941. Containing general physical and chemical methods for testing soft rubber goods, this specification does not include the special test methods applicable to certain materials which are described in the appropriate specification or does it include all of the test methods for soft rubber goods used in the industry.

"The Givaudanian." January-February. Givaudan-Delawanna, Inc., 330 W. 42nd St., New York, N. Y. 4 pages. This issue deals exclusively with a study on skin irritation as it relates to the use of the firm's antiseptics in rubber goods. Results of tests on rabbits show that these materials are non-irritating to the skin and mucous membrane when incorporated in rubber in concentrations sufficient to render the goods effectively antiseptic. It is pointed out that irritation is to be avoided particularly in the case of dress shields, baby pants, girdles, or other rubber products that remain in intimate contact with the skin for many hours.

"Meeting the Demand for Faster Production." No. 39 in a series of Booklet-Editorials. Farrel-Birmingham Co., Inc., Ansonia, Conn. 16 pages. According to this study, the problem of putting industry on a wartime basis in a relatively short period becomes essentially one of enormously raising production per man-hour. Two pertinent facts are presented: since 1933 small gains have been made in reducing labor time per unit of output; and with one exception (the aircraft industry) in our important defense industries six to eight machines out of ten are over ten years of age. A program of man-hour conservation is offered, based on four factors in machinery modernization: increases in speed of operation without sacrifice of quality; increases in the degree of skill transferred to mechanisms; improvements which simplify disassembly, adjustment, cleaning, and resetting; and improvements which diminish the hazards or arduousness of operations. The conclusion is reached that plant modernization should complement plant expansion.

"The RMA Manual of Tire Repairing." Fourth Edition. The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y. 48 pages. Price 10¢, postpaid. This is the fourth edition of this manual designed to aid the tire repairman. The booklet covers in sequence: inspection; preparation; the "Step-Up" method of tire repairing for passenger car, truck, and bus balloon tires; preserving or renewing the tread design; inner tube repairs; and curing. In addition to this manual, the member rubber companies of the association will furnish upon request the "RMA Manual of Retreading and Recapping."

"List of Inspected Fire Protection Equipment and Materials." January, 1941. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. 163 pages. This list, which replaces similar previous lists, includes cotton rubber-lined fire hose and rubber-containing chemical engine hose.

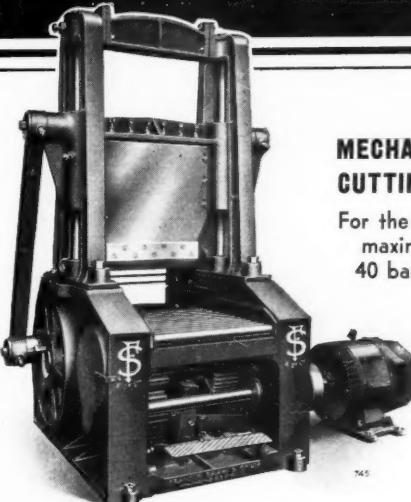
"Amercoat Corrosion Proof Non-Contaminating Plastic Coatings." American Concrete & Steel Pipe Co., Box 3428, Terminal Annex Post Office, Los Angeles, Calif. 16 pages. Amercoat is described in this booklet as a combination of inert thermoplastic resins, unaffected by mineral acids and alkalies and solutions of their salts. It is also said to be impervious to oils, fats, waxes, gasoline, all aliphatic alcohols, and glycerol. Low water absorption, good dielectric properties, and resistance to electrolysis are other characteristics cited. Amercoat, however, is affected by aromatic hydrocarbons, chlorinated hydrocarbons, esters, ketones, and aldehydes. The coating was designed principally to overcome corrosion on steel and concrete and to protect the products which these structural materials contain against contamination. Among the industries finding application for Amercoat are: bottling, citrus fruit, dairy, brewing, laundry, wine, fishing, and petroleum. Amercoat tested in latex for a period of six months, showed no sign of breakdown, it is claimed.

"Hewitt Rubber Products for Industry." Hewitt Rubber Corp., Buffalo, N. Y. 36 pages. This catalog is devoted almost entirely to the firm's hose products for industry which include the following types: air drill; pneumatic tool; welding; steam; water; water suction; sand suction; fire; chemical engine; agricultural spray; brewery and winery; sanitary for liquid food products; acid; sand blast; cement gun; flue cleaning; and vacuum and air brake. Sections on industrial packings and hose couplings are also presented, together with an interesting table of chemicals that affect and that do not affect rubber.



BALE CUTTERS

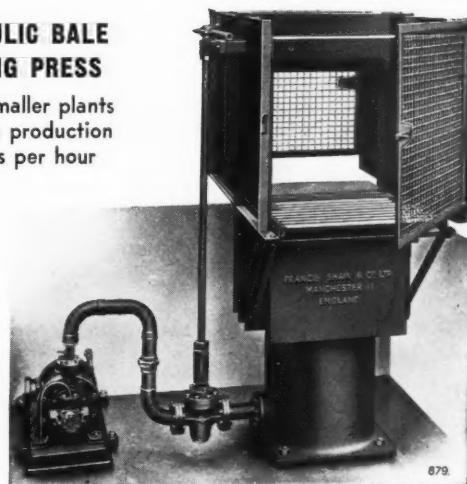
MECHANICAL BALE CUTTING MACHINE
For the larger plants
maximum output
40 bales per hour



745

HYDRAULIC BALE CUTTING PRESS

For the smaller plants
Maximum production
10 bales per hour



FRANCIS SHAW & CO. LTD.
MANCHESTER. II. ENGLAND

MARINE

MARINCO BRAND

MARINE MAGNESIUM PRODUCTS CORPORATION
(formerly) MARINE CHEMICALS COMPANY

Original Producers of
MAGNESIUM SALTS
Directly from SEA WATER

A dependable source of supply for
MAGNESIUM CARBONATES
HYDROXIDES, OXIDES

U.S.P. and Special Grades

Main Office, Plant and Laboratories
SOUTH SAN FRANCISCO, CALIFORNIA

NEW YORK OFFICE: CHICAGO OFFICE: ST. LOUIS OFFICE:
Whittaker, Clark & Daniels, Inc. Harry Holland & Son, Inc. G. S. Robins & Co.
260 West Broadway 400 W. Madison St. 126 Chouteau Ave.

TIRE MOLDS



AND MOLDS FOR RUBBER SPECIALTIES AND MECHANICAL GOODS

machined in a large modern shop at low prices by specialists in the field. We also build special machinery to your drawings.

Submit inquiries for low quotations.

THE AKRON EQUIPMENT CO.
AKRON - OHIO

"Santocure in Rubber Compounding for the Wire Industry." Rubber Service Department, Monsanto Chemical Co., Akron, O. 16 pages. This is a supplement to a previously issued booklet, "Rubber Compounding for the Wire Industry", and deals with insulating compounds, accelerated with Santocure alone and in conjunction with other accelerators. The booklet points out that Santocure, while inert at low temperatures, breaks down at normal curing temperatures into components which give fast acceleration. Advantages of reduced danger of scorching and adaptability to pan or drum curing or the continuous vulcanization process are cited. The data point to the particular suitability of Santocure-El Sixty combinations for continuous vulcanization work.

"Agriculture in the Americas" is the name of a new monthly United States Department of Agriculture publication, prepared by the Office of Foreign Agricultural Relations. The new publication will report in particular on such crops as rubber, fibers, and drugs which Latin America can grow for use in the United States. Articles in the first issue include "Speaking of Rubber", a discussion of the economic importance of rubber and the necessity of an accessible and continuous supply of this raw material; "Can the Americas Live Alone?", dealing with the agricultural surplus-and-deficit problem; and "Bolivia at the Crossroads", a description of the agricultural and economic life within Bolivia. The subscription price will be 75¢ per year in the United States and in most other countries of the western hemisphere. Foreign subscriptions will be \$1.20 a year. Single copies are 10¢. Remittances should be sent to the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

"Rubber Finishes—RF-736, RF-737, and RF-1362." S. C. Johnson & Son, Inc., Racine, Wis. 4 pages. The applications and advantages of the firm's three new water-repellent wax dressings for rubber goods are cited in this leaflet. Methods of application are also briefly discussed. A factor influencing the luster with these water emulsions is the regulation of particle size during manufacture, it is claimed.

"Guide to Literature on Rubber." Letter Circular LC626. National Bureau of Standards, Washington, D. C. 34 pages. This guide, superseding a previous circular on the subject, contains a brief review of current books, periodicals, handbooks, pamphlets, government documents, and other publications relating to rubber. It also indicates some of the government departments, societies, institutions, and firms which conduct investigations on rubber and issue publications describing their work. Current American literature is stressed, and the aim is to indicate sources from which information can be obtained, rather than to give detailed bibliographies on specific topics. Especial attention, however, is directed to literature in which bibliographies and lists of references are given.

"Koppers Chemicals from Coal." Koppers Co., Tar & Chemical Division, Koppers Bldg., Pittsburgh, Pa. 32 pages. This booklet suggests uses for and gives properties of 25 of the firm's coal tar chemicals which are today available in commercial quantities. The materials include: a flotation sulphur paste, a finely divided sulphur dispersion that may be used for latex vulcanization; benzene and toluene, which are of interest as solvents; and pyridine and carbazole, of interest as starting materials in the preparation of rubber chemicals.

"1941 Market Data Book Number." *Industrial Marketing*, 100 E. Ohio St., Chicago, Ill. 400 pages. This book is designed to give basic data on industrial and trade markets and the business papers serving these markets. It should be of value to all those interested in selling goods or services to trade and industry.

"Inspected Electrical Equipment." November, 1940. Supplement. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. 112 pages. This supplement contains listings established subsequent to the May, 1940, list, which must also be consulted for complete information relative to names of manufacturers and appliances approved. The list includes rubber-covered wires and rubber attachment plug caps.

RUBBER BIBLIOGRAPHY

THE CANADIAN RUBBER INDUSTRY. *India-Rubber J.*, Jan. 11, 1941, p. 1.

SYNTHETIC v. PLANTATION. T. L. Garner, *India-Rubber J.*, Jan. 11, 1941, p. 2.

1940. *India-Rubber J.*, Dec. 28, 1940, pp. 1-3.

RUBBER PLANTATION RESEARCH. H. Ashplant, *India-Rubber J.*, Dec. 28, 1940, pp. 6-8.

THE RUBBER EXPORT GROUP. *India-Rubber J.*, Jan. 4, 1941, pp. 6-7.

MODERN METHODS OF OPENING JUNGLE FOR RUBBER PLANTING. *India-Rubber J.*, Dec. 21, 1940, pp. 4-5.

FORMATION OF COMPOUNDING INGREDIENTS IN RUBBER. D. F. Twiss, A. E. T. Neale, and R. W. Hale, *Trans. Inst. Rubber Ind.*, Oct., 1940, pp. 111-16.

DETERMINATION OF FREE SULPHUR IN VULCANIZED RUBBER. J. G. Mackay and C. H. J. Avons, *Trans. Inst. Rubber Ind.*, Oct., 1940, pp. 117-22.

HYSTERESIS TESTS ON TIRE COMPOUNDS. J. G. Mackay, J. G. Anderson, and E. R. Gardner, *Trans. Inst. Rubber Ind.*, Oct., 1940, 123-37.

FACTORS INFLUENCING THE T-50 VALUE. E. R. Gardner, *Trans. Inst. Rubber Ind.*, Oct., 1940, pp. 138-56.

TENNIS BALLS IN THE MAKING. *Sporting Goods Dealer*, Jan., 1941, pp. 51-52.

CONCENTRATION OF LATEX BY CENTRIFUGAL MACHINES. J. H. Piddlesden, *J. Rubber Research Inst. Malaya*, 10, Comm. 250, 78-107 (1940).

CRUDE RUBBER PRODUCED IN FORMOSA. T. Koide, C. Kawakami, T. Kubota, and M. Yamaguchi, *J. Soc. Chem. Ind. Japan*, 43, 198-99b (1940).

PINE TAR II. Tests in Zinc Oxide and Zinc Oxide-Gas-Black Mixings. J. R. Scott, *J. Rubber Res.*, 9, 73-80 (1940).

SYNTHETIC RUBBER. A. E. Williams, *Engineer*, 170, 164-65 (1940).

POLYISOBUTYLENE COMPOSITIONS. L. Light, *Oil Colour Trades J.*, 98, 297 (1940).

USE OF CHLORINATED RUBBER AND DIATOMACEOUS SILICA IN ROAD PAINTS. H. C. Bryson, *Paint Tech.*, 5, 86-87 (1940).

ORGANIC COLORS FOR RUBBER. H. Jones, *J. Oil Colour Chem. Assoc.*, 23, 287-99 (1940).

EMULSION POLYMERIZATION SYNTHETIC RUBBERS. H. Barron, *Brit. Plastics*, 12, 121-26, 137 (1940).

APPARATUS FOR STUDY OF PHOTOCHEMISTRY OF SHEET MATERIALS. H. F. Launer, *J. Research Natl. Bur. Standards*, 24, 567-77 (1940).

USES OF NATURAL AND SYNTHETIC RUBBERS IN WET PROCESSING OF TEXTILES. R. A. Hodgson, *J. Soc. Dyers Colourists*, 56, 377-384 (1940).

ZINC OXIDE—A PRODUCT OF COMPLEX PHYSICAL AND CHEMICAL PROPERTIES. H. A. Depew, *Paint, Oil Chem. Rev.*, 102, 17, 9-10 (1940).

COAGULATION OF RUBBER LATEX AND ITS CONTROL. D. F. Twiss and P. H. Amphlett, *J. Soc. Chem. Ind.*, 59, 202-206 (1940).

THE DETERMINATION OF AVERAGE MOLECULAR WEIGHTS OR PARTICLE SIZES FOR POLYDISPERSED SYSTEMS. E. O. Kraemer, *J. Franklin Inst.*, Jan., 1941, p. 1-21.

OIDIUM MILDEW ON RUBBER PLANTATIONS AND ITS PREVENTION. E. Hardy, *Rubber Age (N. Y.)*, Feb., 1941, pp. 313-14.

PROPERTIES, PROCESSING AND COMPOUNDING OF HYCAR O. R. SYNTHETIC RUBBER. *Rubber Age (N. Y.)*, Feb., 1941, pp. 315-18.

NEW CHEMICAL LABORATORY OF MONSANTO'S RUBBER SERVICE DEPARTMENT. *Rubber Age (N. Y.)*, Feb., 1941, p. 319.

X-RAY STUDIES OF RUBBER. I. Fundamentals. G. L. Clark, *Rubber Age (N. Y.)*, Feb., 1941, pp. 321-27. (To be continued.)

IMPROVEMENT IN HANDLING ACIDS IN STEEL PICKLING OPERATIONS. *Rubber Age (N. Y.)*, Feb., 1941, p. 328.

PLASTICS IN WEARING APPAREL. H. S. Bunn, *News Edition (A. C. S.)*, Feb. 10, 1941, pp. 135-39.

GYPSUM MOLDS FOR LATEX ARTICLES. *Rubber Age (London)*, Jan., 1941, pp. 305-306.

LATEX CONCENTRATION BY CENTRIFUGAL MACHINES. *Rubber Age (London)*, Jan., 1941, p. 306.

WHAT OF 1941—? *Rubber Age (London)*, Jan., 1941, pp. 307-308, 311.

BARBER GENASCO

(M. R.)

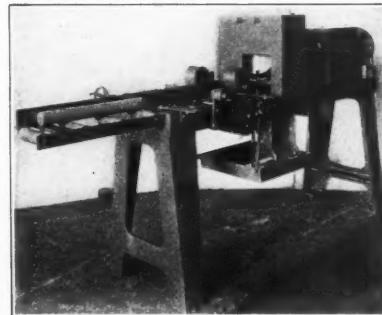
Hydrocarbon (SOLID OR GRANULATED)

• A hard, stable compound—produced under the exacting supervision of an experienced and up-to-date laboratory. Genasco Hydrocarbon has proved itself to be always of uniform quality. Shipped to all parts of the world in metal drums. Stocks carried at Barber, New Jersey.

BARBER ASPHALT CORPORATION

New York Madison, Ill. Chicago

A NEW SLICER FOR EXTRUDED STOCKS



With High Speed Disc Cutting Blade,
Automatic Feed and with Tandem
Feed Wheels. Capacity Section Up to
3" by 4½"—Length ½" to 6".

UTILITY MANUFACTURING COMPANY Cudahy, Wisconsin

Cable Address: UTILITY-MILWAUKEE
Long Distance Phone Call
MILWAUKEE—SHERIDAN 7020

QUALITY**BELTING**

Transmission—Conveyor—Elevator

HOSEfor every purpose
Water—Fire—Air—Steam**INTEGRITY**

60 YEARS WITHOUT REORGANIZATION

**SERVICE****PACKING**Sheet & Rod Packings
for every condition**HOME RUBBER COMPANY**Factory & Main Office
TRENTON, N. J.

LONDON: 107 Clifton St., Finsbury

CHICAGO: 168 North Clinton St.

NEW YORK: 80-82 Reade St.

LIQUID LATEX**NORMAL and CONCENTRATED**Agents in U. S. A. for Dunlop Concentrated 60%
Latex, Product of Dunlop Malayan Estates, Ltd.**CHARLES T. WILSON CO., INC.**

99 WALL STREET

NEW YORK, N. Y.

BOSTON, Ernest Jacoby & Co., 79 Milk St.

AKRON, Charles T. Wilson Co., Inc., 803 United Bldg.

PACIFIC COAST, Reinke, Hiller & Amende, Inc., 1925 E. Olympic Blvd., Los Angeles, Calif.

SALES REPRESENTATIVES

BROCKTON TOOL COMPANY

Central Street

QUALITY MOULDS FOR ALL PURPOSES

South Easton, Mass.

THE FIRST STEP — A QUALITY MOULD

GUAYULE RUBBER

Washed and Dry, Ready for Compounding

PLANTATION RUBBER

From Our Own Estates in Sumatra

CONTINENTAL RUBBER COMPANY OF NEW YORK
745 Fifth Avenue New York**INTERNATIONAL PULP CO.**

41 Park Row, NEW YORK, N. Y.

SOLE PRODUCERS

ASBESTINE

REG. U. S. PAT. OFF.

AIR BAG BUFFING MACHINERY
STOCK SHELLS HOSE POLES
MANDRELS**NATIONAL SHERARDIZING & MACHINE CO.**

868 WINDSOR ST.

HARTFORD, CONN.

Representatives
Akron San Francisco

New York

AN APPROVED CLAY**SOUTHEASTERN CLAY COMPANY**

AIKEN, SOUTH CAROLINA

Market Reviews

CRUDE RUBBER

Commodity Exchange

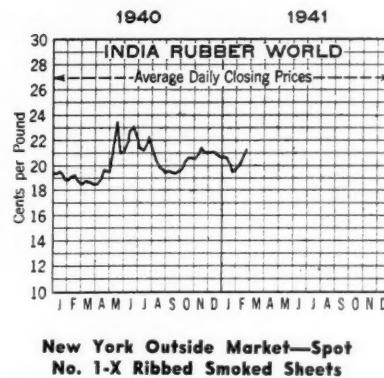
TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

	Dec.	Jan.	Feb.	Feb.	Feb.	Feb.
Futures	28	25	1	8	15	22
"New" Standard						
Feb.	19.42	19.77	19.90	20.25	20.76	
Mar.	20.05	19.42	19.77	19.90	20.25	20.76
July	19.70	19.23	19.58	19.62	19.70	20.00
Sept.	19.60	19.15	19.40	19.50	19.45	19.80
Dec.	19.05	19.30	19.40	19.25	19.80	
Jan.	19.27	19.37	19.20	19.75		
No. 1 Standard						
Mar.	20.05	19.42	19.77	19.90	20.25	20.76
May	19.90	19.30	19.63	19.80	20.11	20.72
Volume per week "New"						
Standard. 160 1,280 990 3,110 4,860 2,530						
No. 1 Standard. 7,070 2,690 2,060 2,750 4,440 3,080						

CONCERN over a possibility of a tight shipping situation and trouble in the Far East, as well as reports of record United States consumption caused crude rubber prices to advance during the past month with increases that more than offset the decline in January. May futures (old contract), which closed at 19.64¢ per pound on January 31, rose throughout February to close over 100 points higher at 20.72¢ per pound on February 21. The advance for distant months (new contract) was considerably less. Thereafter the market was easier, with May futures closing at 20.63¢ per pound on February 27. Trading during the month became more active, with the "New" standard figuring more prominently in transactions.

The possibilities of increasing the shipping facilities by ordering allotment of more space for rubber and by routing rubber to the Pacific Coast and thence overland instead of via the longer Panama Canal route were advanced. The results of such a program would be to save time in transit and decrease the length of time during which boat tonnage would be tied up. It was pointed out that in the near future American vessels now under construction for Pacific service would be completed.

Rubber consumption in the United States during January reached 64,225 tons, a new all-time high. Although a record level was predicted here last month, the actual figure was in excess of expectations. Domestic consumption



New York Outside Market—Spot No. 1-X Ribbed Smoked Sheets

New York Outside Market Rubber Quotations

	Feb. 27, 1940	Jan. 28, 1941	Feb. 25, 1941
Normal, 38-40%, gal.	\$0.71/0.72	\$0.75/0.76	\$0.80/0.81
Centrifuged, 60-63% ....gal.	... 1.30/1.31	1.37/1.38	
Paras			
Upriver fine....lb.	.1634	.1634	.1934
Upriver fine....lb.	*.1834	*.1934	.22
Upriver coarse....lb.	11 1/2	.11	.1234
Upriver coarse....lb.	*.16	*.17	.19
Islands fine....lb.	.16	.1634	.19
Islands fine....lb.	*.1834	*.19	*.2134
Acre, Bolivian fine ....lb.	.17	.1634	.20
Acre, Bolivian fine ....lb.	*.1934	*.1934	*.2234
Beni, Bolivian fine ....lb.	.1734	.1734	.19
Madeira fine....lb.	.1634	.1634	.1934
Caucho			
Upper ball....lb.	.11 1/2	.11	.12 1/2
Upper ball....lb.	*.16	*.17	.19
Lower ball....lb.	.11 1/4	.10 1/2	.11 3/4
Pontianak			
Pressed block....lb.	.12/20	.15/27	.16 1/4/24
Guayule			
Ampar ....lb.	.15	.15 1/2	.15 1/2
Africans			
Rio Nuñez ....lb.	.19	.18 1/2	.18
Black Kassai ....lb.	.19	.19	.18 1/2
Prime Niger flake ....lb.	.22	.22 1/2	.22 1/2
Gutta Percha			
Gutta Sial ....lb.	.17	.16 1/2/17 1/2	.17 1/2
Gutta Soh ....lb.	.24	.26	.24
Red Macassar ....lb.	.120	.120	.120
Balata			
Block Ciudad Bolivar ....lb.	.40	.42	.45
Manaos block....lb.	.40	.45	.52
Surinam sheets....lb.	.47	.54	.51
Amber ....lb.	.49	.56	.53

*Washed and dried crepe. Shipments from Brazil.

during February was believed to be running at the high January level, but with fewer working days the aggregate will probably be in neighborhood of 55,000 tons or slightly higher. Total supplies in this country at the end of January, based on a three months' running average of consumption, were sufficient for 5.8 months. Of this rubber, the equivalent of 2.3 months' supplies were held by the Government.

Effective April 1, ocean freight rates from the Far East (contracts under Straits New York Freightage Conference tariff No. 16, and Straits Pacific No. 8) will be raised 25% to the nearest quarter dollar. A reduction of 1/8% in war risk insurance rates was made, applying to American flag vessels on the Pacific route.

The Commodity Exchange, Inc., estimated that the amount of rubber in London and Liverpool warehouses and in the hands of United Kingdom rubber manufacturers more than doubled during 1940. On December 31, 1939, stocks totaled 51,615 tons; while on December 31, 1940, they are calculated to have amounted to 108,253 tons.

Net exports of crude rubber from restriction countries, excluding Thailand and French Indo-China, totaled 110,135 tons in December, against 90,743 tons exported in November. Permissible exports for December were 110,836 tons, including the pro-rata carryover from 1939. The total excess of actual over permissibles for 1940 was 18,957 tons, which is far below the 5% of total excess allowable, 62,237 tons.

The International Rubber Regulation Committee on February 25 decided to fix the export quota for the second quarter of 1941 at 100% of basic quotas, which is the rate now in effect.

New York Outside Market

Factories were active purchasers of rubber in the outside market during February. Crepe, amber, and brown grades were in active demand in addition to smoked sheets. Offerings from the Far East were limited with a tightening of the shipping situation. The market scored sharp gains during the month. No. 1-X ribbed smoked sheets, in cases, which closed at 19 1/4¢ per pound on February 1, held steady at 20¢ during the first week of the month and then advanced sharply to close at 21 1/4¢ per pound on February 21. The closing price on February 27 was 21¢ with the market easier.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	January, 1941												February, 1941											
	27	28	29	30	31	1	3	4	5	6	7	8	10	11	12†	13	14	15	17	18	19	20	21	22†
No. 1-X R.S.S. in cases*	19 1/2	19 1/2	19 1/4	19 1/4	19 1/2	19 1/2	19 1/2	20	20	20	20	20	20	20	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	21	21 1/2	21 1/2	21 1/2	21 1/2
No. 1 Thin Latex Crepe	19 1/2	19 1/2	19 1/2	20	20	20	20	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	20 1/2	21	21 1/2	21 1/2	21 1/2	21 1/2
No. 2 Thick Latex Crepe	19 1/2	19 1/2	19 1/2	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
No. 1 Brown Crepe	18	18	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	19 1/2	19 1/2	19 1/2	19 1/2	
No. 2 Brown Crepe	17 1/2	17 1/2	17 1/2	18	18	18	18	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	19 1/2	19 1/2	19 1/2	19 1/2	
No. 2 Amber	18	18	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	19 1/2	19 1/2	19 1/2	19 1/2	
No. 3 Amber	17 1/2	17 1/2	17 1/2	18	18	18	18	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	18 1/2	19 1/2	19 1/2	19 1/2	19 1/2	
Rolled Brown	15	15	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	15 1/2	16	16 1/2	16 1/2	16 1/2	17 1/2	

*No 1 Ribbed Smoked Sheets are 1/4¢ lower than No. 1-X R.S.S. in cases quoted here. †Holiday.

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U.S. Imports*	U.S. Consumption†	U.S. Stocks Mfrs., Importers, Etc.‡	U.K.—Public Warehouses, Stocks London, and Afloat Liverpool‡‡	Singapore and Penang Dealers Stocks‡‡	World Production (Net Exports)‡	World Consumption (Estimated)	World Stocks§§
1938	400,178	437,031	231,500	45,105	86,853	27,084	894,900	942,252
1939	499,616	592,000	125,800	91,095	44,917a	15,299	1,004,429	1,110,358
1940	818,102	618,349	340,857	153,169	.....	26,773	1,390,469	447,666a
1940	.....	.....	.....	.....	.....	.....	.....	.....
Jan.	72,520	54,978	142,368b	90,285b	.....	35,928	108,883	106,073
Feb.	43,088	49,832	134,328b	112,257b	.....	35,563	113,863	96,755
Mar.	59,277	50,192	142,414b	113,619b	.....	23,830	112,221	102,282
Apr.	70,699	50,103	162,459b	102,557b	.....	42,239	87,482	100,570
May	51,431	51,619	161,446b	109,364b	.....	32,731	123,047	94,988
June	53,889	46,506	168,235b	119,138b	.....	32,375	110,345	78,642
July	69,596	47,011	190,222b	139,629b	.....	36,716	127,313	75,607
Aug.	73,028	50,234	213,002b	141,286b	.....	40,395	120,857	80,011
Sept.	78,973	50,206	241,358b	137,033b	.....	29,069	133,784	77,978
Oct.	74,716	56,477	259,140b	166,837b	.....	33,638	126,228	87,177
Nov.	72,901	54,652	276,943b	158,095b	.....	33,778	99,254	84,352
Dec.	97,984	56,539	318,486b	145,950b	.....	26,773	127,189	.....
1941	.....	.....	.....	.....	.....	.....	.....	.....
Jan.	86,833	64,225	340,857b	153,169b	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manao, regulated areas, and afloat. ||Corrected to 100% from estimate of reported coverage. a. Stocks as of Aug. 31, 1939. b. Includes government emergency rubber.

CONSUMPTION of crude rubber by United States manufacturers during January, 1941, is estimated at 64,225 long tons by the R. M. A., which is the highest single month's consumption on record and 12.4% greater than the previous high of 57,155 long tons in October, 1939. January consumption also was 13.6% over December, 1940, and 16.8% over January, 1940.

Gross imports for January, as reported by the Department of Commerce, at 86,833 long tons, were 11.4% under the high of 97,984 long tons imported in December, 1940, but 19.7% over Janu-

ary, 1940, imports.

Total domestic stocks are estimated by the Association to have been 340,857 long tons on January 31, 7% over the stocks on hand December 31, 1940, and 139% over the stocks on hand January 31, 1940.

Stocks in the hands of the U. S. Government on January 31 were 134,338 long tons, an increase of 19.1% over December 31 Government stocks.

Crude rubber afloat to U. S. ports January 31 is estimated at 153,169 long tons, 4.9% above December and 69.7% above January, 1940.

RECLAIMED RUBBER

ACCORDING to R. M. A. figures, January reclaimed rubber consumption is estimated at 18,636 long tons, 8.9% above that of December; production, 20,413 long tons; and stocks on hand January 31, at 35,344 long tons.

This high rate of absorption was reported to be continuing through February, with all consuming branches of the rubber industry—tires, insulated wire, mechanicals, soles and heels, and footwear—reported to be active purchasers of reclaim. According to Department of Commerce figures, 1,434-

United States Reclaimed Rubber Statistics—Long Tons

Year	Production†	Consumption‡	Consumption % of Crude	U.S. Stocks§†	Exports
1938	122,493	120,800	27.6	23,000	7,403
1939	196,000	170,000	28.7	25,250	12,611
1940	209,601	187,090	30.3	34,701	.....
1941	.....	.....	.....	.....	.....
Jan.	19,297	16,070	29.2	27,418	1,059
Feb.	17,992	15,370	30.8	28,602	1,436
Mar.	17,234	15,931	31.7	28,488	1,420
Apr.	16,568	16,298	32.5	27,558	977
May	17,552	15,719	30.5	28,397	866
June	16,631	14,912	32.1	29,260	1,207
July	14,342	14,298	30.4	28,058	1,232
Aug.	17,213	14,224	28.3	29,786	1,300
Sept.	16,428	14,589	29.1	30,287	1,031
Oct.	19,358	16,528	29.3	32,118	716
Nov.	17,689	16,042	29.4	33,143	681
Dec.	19,297	17,109	30.2	34,701	.....
Jan.	20,413	18,636	29.0	35,344	.....

*Stocks on hand the last of the month or year. †Corrected to 100% from estimates of reported coverage. Compiled by The Rubber Manufacturers Association, Inc.

340 pounds of reclaim were exported during December, with 1,184,631 pounds going to Canada.

The market is steady, and all grades of reclaim continue at last month's levels.

New York Quotations

February 24, 1941

Auto Tire	Sp. Grav.	€ per lb.
Black Select	1.16-1.18	6 / 64
Acid	1.18-1.22	7 / 74

Shoe

Standard	1.56-1.60	6 1/4 / 6 1/4
----------	-----------	---------------

Tubes

Red Tube	1.15-1.30	9 1/4 / 9 1/4
Compound	1.10-1.20	10 1/4 / 10 1/4

Miscellaneous

Mechanical Blends	1.25-1.50	4 1/2 / 5
White	1.35-1.50	12 1/2 / 14

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclams in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

RUBBER SCRAP

WITH reclaimed rubber production at a high level, the demand for scrap rubber continued active. Export business was reported to be quiet last month and January. According to the Department of Commerce, 9,459,357 pounds of scrap rubber were exported during December, against 10,608,510 pounds in November. Of the December total, 6,553,482 pounds were shipped to Japan.

The market is generally steady with price advances registered in only two grades: colored boots and shoes and No. 2 compound tubes.

Consumers' Buying Prices

(Carlot Lots for February 24, 1941)

Boots and Shoes

Prices
Boots and shoes, black.....lb. \$0.01 1/4 / \$0.01 1/4
Colored.....lb. .01 / .01 1/4
Untrimmed arctics.....lb. .00 1/4 / .01

Inner Tubes

Prices
No. 1, floating.....lb. .11 / .12
No. 2, compound.....lb. .05 1/4 / .05 1/4
Red.....lb. .04 1/4 / .05
Mixed tubes.....lb. .04 1/4 / .04 1/4

Tires (Akron District)

Pneumatic Standard
Mixed auto tires with
beads.....ton 15.00 / 15.50
Beadless.....ton 19.00 / 19.50
Auto tire carcass.....ton 45.00 / 47.00
Black auto peelings.....ton 46.00 / 48.00

Solid

Clean mixed truck.....ton 34.00 / 36.00
Light gravity.....ton 42.00 / 44.00

Mechanicals

Mixed black scrap.....ton 33.00 / 34.00
Hose, air brake.....ton 22.00 / 24.00
Garden, rubber covered.....ton 12.00 / 14.00
Steam and water, soft.....ton 12.00 / 14.00
No. 1 red.....lb. .03 1/4 / .03 1/4
No. 2 red.....lb. .02 1/4 / .02 1/4
White druggists' sundries.....lb. .03 1/4 / .04
Mixed mechanicals.....lb. .02 1/4 / .02 1/4
White mechanicals.....lb. .03 1/4 / .04

Hard Rubber

No. 1 hard rubber.....lb. 11 1/2 / 13

COMPOUNDING INGREDIENTS

WITH crude rubber consumption during February continuing at the record high level of January, compounding ingredients were in heavy demand from all divisions of the rubber industry. No let-up in activity is foreseen for at least the next few months.

The Canadian Government, according to the *Oil, Paint and Drug Reporter*, plans to reduce imports of barytes by increasing domestic output, which was only 300 tons in 1939. High-grade deposits have been discovered recently near Windsor, Nova Scotia.

CARBON BLACK. Domestic demand, which continued at a high level during the past month, is expected to hold into the second quarter at least. The export demand continued to decline so that total shipments of black were again estimated to be less than production. January production exceeded shipments by about 1,000,000 pounds, bringing total stocks up to 163,000,000 pounds on January 31. This compares with 125,000,000 pounds on the same date last year. The large increase in stocks during 1940 was attributed to the sharp decline in exports since the outbreak of the war. Prices continue to hold steady.

CLAY. The demand for clay was reported very heavy from the mechanical goods industry, which is experiencing considerable increased activity as a re-

sult of the national defense program.

FACTICE OR RUBBER SUBSTITUTE. The demand continued at a good level, with prices generally steady.

LITHARGE. Demand held to a good level. The carlot price of the commercial powdered material was advanced 0.15¢ per pound, with the less carload price unchanged.

LITHOPONE. A good demand from the rubber industry was reported, with prices steady and unrevised.

RUBBER CHEMICALS. As in January, the demand from all branches of the consuming industry was reported to be exceptionally heavy during the past month. Prices are generally steady.

RUBBER SOLVENTS. Rubber manufacturers were less active buyers last month as a result of stocks accumulated by earlier purchases. Prices were firm and unchanged.

TITANIUM PIGMENTS. Deliveries, which were largely on contract, continued heavy. Prices are unchanged.

ZINC OXIDE. Shipments to rubber manufacturers continued in large volume. A shortage of zinc metal has forced curtailment of the production of French process oxide, and defense priorities on the metal may impose further limitations. There are ample supplies and production of American-process-type oxides which are produced from ore. Prices continue steady.

Current Quotations*

Abrasives

Pumicestone, powdered lb. \$0.03 / \$0.035
Rottenstone, domestic lb. .03 / .035

Accelerators, Inorganic

Lime, hydrated, l.c.l., New York ton 20.00
Litharge (commercial) lb. .08

Accelerators, Organic

A-1 lb. .24 / .30
A-10 lb. .31 / .35
A-19 lb. .52 / .65
A-32 lb. .70 / .80
A-77 lb. .42 / .55
A-100 lb. .42 / .55
Accelerator 49 lb. .40 / .42
531 lb. .48 / .50
737 lb. .42 / .43
737-50 lb. .25 / .26
808 lb. .70 / .72
833 lb. 1.15
Acrin lb. .60
Aldehyde ammonia lb. .65 / .70
Altax lb. .55 / .60
B-J-F lb. .50 / .55
Beutene lb. .70 / .75
Butyl Eight lb. .98 / 1.00
Zimate lb. 2.15
C-P-B lb. 2.00
Captax lb. .50
Crylene Paste lb. .50
D-B-A lb. 2.00
Delac A lb. .40 / .50
O lb. .40 / .50
P lb. .40 / .50
Di-Esterex-N lb. .60 / .70
DOTG (Di-ortho-tolylguanidine) lb. .44 / .46
DPG (Diphenylguanidine) lb. .35 / .36
El-Sixty lb. .50 / .65
Ethylidene aniline lb. .42 / .43
Ethyl Zimate lb. 2.15
Formaldehyde P.A.C. lb. .06
Formaldehyde-para-toluidine lb. .52 / .54

Formaniline lb. \$0.31 / \$0.32
Guantal lb. .40 / .50
Heptene lb. .35 / .40
Base lb. 1.35 / 1.50
Hexamethylenetetramine lb. .39
U.S.P. lb. .33
Technical lb. .135
Lead oleate, No. 999 lb. .15
Witco lb. .15
Leditate lb. 2.00
Monex lb. 2.00
Novex lb. .50 / .55
O-X-A-F lb. .70 / .90
Oxynone lb. .85
Para-nitroso-dimethylaniline lb. .50 / .55
Pentex lb. 1.00 / 1.10
Flour lb. .15 / .16
Phenex lb. .50 / .55
Pip-Pip lb. 2.50
Pipsolene lb. 1.55 / 1.85
R-23 lb. .40
R & H 50-D lb. .42 / .43
Rotax lb. .60 / .65
Safex lb. 1.20 / 1.30
Santocure lb. .80 / 1.00
Selenac lb. 2.50
SPDX lb. .70 / .75
A lb. .70 / .75
Super-sulphur No. 1 lb. .50
2 lb. .18 / .20
Tetrone A lb. 2.35
Thiocarbanilide lb. .24 / .30
Thionex lb. 2.00
Thiurad lb. 2.35
Trimene lb. .55 / .65
Base lb. 1.05 / 1.20
Triphenylguanidine (TPG) lb. .45
Tuads lb. 2.00
2-MT lb. .54
Ultro lb. 1.25 / 1.75
Ureka lb. .60 / .75
Blend B lb. .60 / .75
C lb. .56 / .65
Vulcanex lb. .42 / .43
Vulcanol lb. .85
Z-B-X lb. 2.50
Zenite lb. .46 / .48
A lb. .53 / .55
B lb. .46 / .48
Zimate (Methyl) lb. 2.00

Activators

Aero Ac 50 lb. .46 / .56
Barak lb. .50
MODX lb. .30 / .35
SL No. 10 lb. .12

Age Resistors

AgeRite Alba	.lb.	\$2.00	
Exel	.lb.	1.00	/\$1.02
Gel	.lb.	.57	/.59
Hipar	.lb.	.65	/.67
Powder	.lb.	.52	/.54
Resin	.lb.	.52	/.54
D	.lb.	.52	/.54
White	.lb.	1.25	/.40
Akroflex C	.lb.	.56	/.58
Albasan	.lb.	.70	/.75
Aminox	.lb.	.52	/.61
Antox	.lb.	.56	
Betanox	.lb.	.52	/.61
Special	.lb.	.65	/.74
B-L-E	.lb.	.52	/.61
Powder	.lb.	.65	/.74
B-X-A	.lb.	.52	/.61
Copper Inhibitor X-872-A	.lb.	1.15	
Flectol B	.lb.	.52	/.65
H	.lb.	.52	/.65
White	.lb.	.90	/.115
M-U-F	.lb.	1.50	
Neozone (standard)	.lb.	.63	
A	.lb.	.52	/.54
B	.lb.	.63	
C	.lb.	.52	/.54
D	.lb.	.52	/.54
E	.lb.	.63	
Oxynone	.lb.	.64	/.80
Parazone	.lb.	.68	
Permalax	.lb.	1.20	
Santoflex B	.lb.	.52	/.65
BX	.lb.	.58	/.71
Santovar A	.lb.	1.15	/.140
Solux	.lb.	.10	
Stabilite	.lb.	.52	/.54
Alba	.lb.	.70	/.75
Thermoflex	.lb.	1.20	/.115
A	.lb.	.65	/.67
Tysonite	.lb.	.16	/.165
V-G-B	.lb.	.32	/.61

Alkalies

Caustic soda, flake, Columbian (400-lb. drums)	.100 lbs.	2.70	/.355
liquid, 50%	.100 lbs.	1.95	
solid (700-lb. drums)	.100 lbs.	2.30	/.315

Antiscorch Materials

A-F-B	.lb.	.35	/.40
Antiscorch T	.lb.	.90	
Cumar RH	.lb.	.10	
E-S-E-N	.lb.	.35	/.40
R-7 Resin (drums)	.lb.	.10	
RM	.lb.	1.25	
Retarder W	.lb.	.36	
Retardex	.lb.	.45	/.48
U-T-B	.lb.	.35	/.40

Antiseptics

Compound G-4	.lb.	
G-11	.lb.	

Antisun Materials

Heizozone	.lb.	.22	/.23
S.C.R.	.lb.	.33	/.35
Sunproof	.lb.	.22	/.27

Blowing Agents

Unicel	.lb.	.50
--------	------	-----

Brake Lining Saturant

B.R.T No. 3	.lb.	.0165	/.0175
-------------	------	-------	--------

Colors

Block

Du Pont powder	.lb.	.42	/.44
Lamblack (commercial), l.c.l.	.lb.	.15	

Blue

Du Pont dispersed	.lb.	.83	/.395
Powders	.lb.	2.25	/.375
Toners	.lb.	.08	/.385

Brown

Mapico	.lb.	.11
--------	------	-----

Green

Chrome oxide (freight allowed)	.lb.	.23	
Du Pont Dispersed	.lb.	.98	/.285
Powders	.lb.	1.00	/.550
Guignet's (bbls.)	.lb.	.70	
Toners	.lb.	.85	/.375

Orange

Du Pont Dispersed	.lb.	.88	/.200
Powders	.lb.	.88	/.275
Toners	.lb.	.40	/.160

Orchid

Toners	.lb.	1.50	/.200
--------	------	------	-------

Pink

Toners	.lb.	1.50	/.200
--------	------	------	-------

Purple

Toners	.lb.	.60	/.210
--------	------	-----	-------

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing all known ingredients. Requests for information not recorded will receive prompt attention.

Red	
Antimony	
Crimson, 15/17%	lb. .048
R. M. P. No. 3	lb. .048
Sulphur free	lb. .52
R.M.P.	
Golden 15/17%	lb. .37
7-A	lb. .23
Z-2	
Cadmium, light (400-lb. bbls.)	lb. .75 / .80
Du Pont dispersed	lb. .93 / 2.05
Powders	lb. .285 / 1.55
Mapico	lb. .0925
Rub-Er-Red (bbls.)	lb. .0925
Toners	lb. .08 / 2.00
White	
Lithopone (bags)	lb. .0385 / .0410
Albalith	lb. .0385 / .0410
Astrolith (50-lb. bags)	lb. .0385 / .0410
Azolith	lb. .0385 / .0410
Titanium Pigments	
Ray-bar	lb. .055 / .065
Ray-cal	lb. .0525 / .0625
Rayox	lb. .135 / .165
Titanolith (50-lb. bags)	lb. .0525 / .055
Titanox-A	lb. .135 / .165
B	lb. .055 / .065
30	lb. .055 / .065
C	lb. .0525 / .0625
M	lb. .055 / .065
Ti-Tone	lb. .135 / .14
Zopaque (50-lb. bags)	lb. .055 / .065
Zinc Oxide	
Azo ZZZ-11	lb. .065 / .0675
44	lb. .065 / .0675
55	lb. .065 / .0675
66	lb. .075 / .0775
French Process, Florence	
Green Seal-8	lb. .0825 / .0850
Red Seal-9	lb. .0775 / .08
White Seal-7	lb. .0875 / .09
Kadox, Black Label-15	lb. .065 / .0675
No. 25	lb. .0775 / .08
Red Label-17	lb. .065 / .0675
Horse Head Special 3	lb. .065 / .0675
XX Red-4	lb. .065 / .0675
23	lb. .065 / .0675
72	lb. .065 / .0675
78	lb. .065 / .0675
80	lb. .065 / .0675
103	lb. .065 / .0675
110	lb. .065 / .0675
St. Joe (lead free)	
Black Label	lb. .065 / .0675
Green Label	lb. .065 / .0675
Red Label	lb. .065 / .0675
U.S.P.	lb. .0975 / .10
Zinc Sulphide Pigments	
Cryptone-BA-19	lb. .0525 / .055
BT	lb. .0525 / .055
CB	lb. .0525 / .055
MS	lb. .055 / .0575
ZS No. 20	lb. .0775 / .08
86	lb. .0775 / .08
230	lb. .0775 / .08
800	lb. .0775 / .08
Sunolith	lb. .0385 / .0410
Yellow	
Cadmolith (cadmium yellow), (400-lb. bbls.)	lb. .50 / .55
Du Pont dispersed	lb. 1.25 / 1.75
Powders	lb. .135 / .137
Mapico	lb. .0675
Toners	lb. 2.50
Dispersing Agents	
Bardex	lb. .0395 / .042
Bardol	lb. .0225 / .025
Darvan No. 1	lb. .30 / .34
No. 2	lb. .30 / .34
Nevol (drums, c.l.)	lb. .0225
Santomerse S	lb. .11 / .25
Fillers, Inert	
Asbestine, c.l.	ton 15.00
Barytes	ton 30.00 / 36.00
f.o.b. St. Louis (50-lb. paper bags)	ton 22.85
off color, domestic	ton 21.50 / 26.50
white, imported	ton .03 / .035
Blanc fixe, dry, precip.	ton 37.50 / 43.00
Calcene	ton .025 / .03
Infusorial earth	ton 24.00 / 30.00
Kalite No. 1	ton 34.00 / 40.00
3	ton 95.00
Kalvan	ton 9.00 / 14.00
Magnesia, calcined, heavy	lb. .0725 / .095
Carbonate, l.c.l.	lb. .045
Paradene No. 2 (drums)	ton 6.50
Pyrax A	ton 6.50
Vinsol Resin	ton .045
Whiting	
Columbia Filler	ton 9.00 / 14.00
Suprex, white extra light	ton 30.00
heavy	ton 30.00
Witco, c.l.	ton 6.00
Finishes	
Black-Out (surface protective)	gal. 4.00 / 5.00
Rubber lacquer, clear	gal. 1.00 / 2.00
colored	gal. 2.00 / 3.50
Shoe Varnish	gal. 1.45
Talc	ton .025 / .035

Flock

Cotton flock, dark	lb. \$0.09	/ \$0.12
dyed	lb. .40	/ .80
white	lb. .12	/ .20
Rayon flock, colored	lb. 1.00	/ 2.00
white	lb. .90	/ 1.00

Latex Compounding Ingredients

Accelerator 85	lb. .35	
89	lb. 1.40	
122	lb. 1.55	
552	lb. 2.15	
Aerosol OT Aqueous 10%	lb. .15	/ .175
Antox, dispersed	lb. .42	
Aquarex D	lb. .75	
F	lb. .85	
Special WA Paste	lb. .28	
Areskap No. 50	lb. .18	/ .24
100, dry	lb. .39	/ .51
Aresket No. 240	lb. .42	/ .22
300, dry	lb. .35	/ .50
Areskleno No. 375	lb. .51	/ .65
400, dry	lb. .22	/ .40
Black No. 25, dispersed	lb. .07	
Collocarb	lb. .38	/ 1.90
Color Pastes, dispersed	lb. .11	/ .12
Copper Inhibitor X-872	lb. .225	
Disperse No. 15	lb. .08	/ .10
Factex Dispersion A	lb. .16	
Hei-zone, dispersed	lb. .25	
Igepon A	lb. .25	
Latac	lb. 2.50	
MICRONEX, Colloidal	lb. .055	/ .07
Nekal BX (dry)	lb. .305	/ 3.55
Pipos X	lb. 2.50	/ 2.75
R-2 Crystals	lb. 2.00	/ 2.25
RN-2 Crystals	lb. .65	
S-1 (400-lb. drums)	lb. .55	
Santobrite Briquettes	lb. .41	
Powder	lb. .11	/ .25
Santomerse D	lb. .90	/ 1.10
Stablex A	lb. .65	/ .90
B	lb. .40	/ .50
Sulphur, dispersed	lb. .10	/ .15
No. 2	lb. .075	/ .12
T-1 (440-lb. drums)	lb. .40	
Tenidone	lb. 1.03	
Vulcan Colors	lb. .55	
Zenite Special	lb. .12	/ .15

Mineral Rubber

Black Diamond	ton 25.00	
B.R.C. No. 20	lb. .009	/ .01
Hydrocarbon, hard	ton 23.00	/ 27.00
Genasco Hydrocarbon, granulated	ton	
solid	ton	
Gilsonite	ton	
Parmer	ton 23.00	/ 27.00
Pioneer	ton	
285°-300°	ton 23.00	/ 42.00

Mold Lubricants

Aluminum Stearate	lb. .18	/ .19
Aquarex D	lb. .75	
WA Paste	lb. .25	
Special	lb. .28	
Lubri	lb. .25	/ .30
Mold Paste	lb. .12	/ .18
Sericite	ton 65.00	/ 75.00
Soapbark	lb. .25	
Soapstone, c.l.	ton 25.00	/ 35.00

Oil Resistant

A-X-F	lb. .82	/ .85
-------	---------	-------

Reclaiming Oils

B.R.V.	lb. .032	/ .0345
No. 1621	lb. .019	/ .02
S.R.O.	lb. .019	/ .02
X-159	lb. .20	
Rox No. 1	lb. .0225	/ .025

Reenforcers

Carbon Black		
Aerfloted Arrow Specification (bags only)	lb. .02925†	
Arrow Compact Granulated	lb. .02925†	
Certified Heavy Compressed (bags only)	lb. .02925†	
Spheron	lb. .02925†	
Continental, dustless	lb. .02925†	
Compressed (bags only)	lb. .02925†	
Disperso	lb. .02925†	
Dixie	lb. .02925†	
Dixiedensed	lb. .02925†	
66	lb. .02925†	
Excels, dustless	lb. .02925†	
Fumonex	lb. .03	
ex. warehouses	lb. .05	
Gastex	lb. .03	/ .07
Kosmobil	lb. .02925†	
66	lb. .02925†	
Kosmos	lb. .02925†	

†Price quoted is f.o.b. works (bags). The price quoted is f.o.b. works (bulk) is 2.75¢ per pound; f.o.b. Hoboken (bulk), 3.63¢; f.o.b. No. Atlantic Docks (bags), 3.80¢. All prices are carlot.

MICRONEX Beads

Mark II	lb. .02925†	
Standard	lb. .02925†	
W-5	lb. .02925†	
W-6	lb. .0475	
P-33	lb. .03	/ .07
Pelleted	lb. .03	
Supreme, dustless	lb. .029	/ .034
Thermax	lb. .029	
Velvetex	lb. .029	/ .034

Carbonex Flakes	lb. .02925†	
-----------------	-------------	--

S	lb. .03	/ .0350
---	---------	---------

Clays	lb. .045	
-------	----------	--

Aerfloted Paragon (50-lb. bags)	ton 10.00	
---------------------------------	-----------	--

Bardex	ton 10.00	
--------	-----------	--

Catalpo, c.l.	ton 30.00	
---------------	-----------	--

Chicora	ton 22.50	
---------	-----------	--

China	ton 10.00	
-------	-----------	--

Crown	ton 10.00	
-------	-----------	--

Dixie	ton 10.00	
-------	-----------	--

Hi-White	ton 10.00	
----------	-----------	--

Langford	ton 7.50	
----------	----------	--

McNamee	ton 10.00	
---------	-----------	--

Par	ton 10.00	
-----	-----------	--

Paraforce, c.l.	ton 60.00	
-----------------	-----------	--

Witco, c.l.	ton 10.00	
-------------	-----------	--

Cumar EX	lb. .045	
----------	----------	--

MH	lb. .06	/ .115
----	---------	--------

V	lb. .09	/ .112
---	---------	--------

Silene	lb. .09	
--------	---------	--

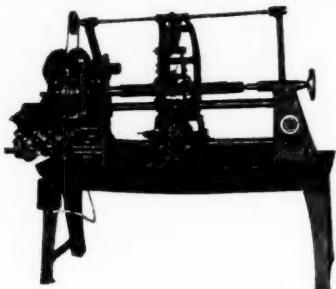
Redoxors

Amora A	lb. .08	

THE 4-A WASHER CUTTING MACHINE

is indispensable for manufacturers of general line of washers and gaskets of rubber, synthetics, and compounded materials. Profitable operation on short or long runs. Will accommodate up to 10" O.D. and cuts up to $\frac{3}{4}$ " in width. Model shown has driven knife. Write for further details of operation.

Note Increase in Outside Diameter.



BLACK ROCK MFG. CO.

175 Osborne Street

Bridgeport, Conn.

Eastern Representatives for the Schuster Magnetic Gauge
Export Office

Pacific Coast Representatives:
Lombard Smith Co.

305 Broadway,
New York, N. Y.

2032 Santa Fe Ave.,
Los Angeles, Cal.

**40% LATEX
60% LATEX
REVERTEX**

73-75% CONCENTRATED

Compounds tailored to your
special requirements

Technical Service is at your Disposal without
charge or obligation



**REVERTEX CORPORATION
OF AMERICA**

37-08 Northern Boulevard, Long Island City, N.Y.

**Regular and Special
Constructions**

of

COTTON FABRICS

Single Filling

Double Filling

and

**ARMY
Ducks**

HOSE and BELTING

Ducks

Drills

Selected

Osnaburgs

Curran & Barry

**320 BROADWAY
NEW YORK**

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

	Dec.	Jan.	Feb.	Feb.	Feb.	Feb.
Futures	28	25	1	8	15	22
Feb.	10.29	10.40	10.35	10.37	10.18	10.30
Mar.	10.03	10.34	10.27	10.23	10.00	10.15
July	9.66	10.03	9.94	9.90	9.69	9.89
Sept.	9.38	9.74	9.71	9.52	9.76	9.73
Dec.	9.38	9.71	9.68	9.50	9.73	
Jan.	9.38	9.71	9.68	9.50	9.73	

THE cotton market ruled slightly weaker during the past month, and the New York 18-inch spot middling price, after closing at 10.92¢ per pound on January 31, moved within fairly narrow limits during February and closed at the somewhat lower level of 10.86¢ per pound on February 21. Thereafter the market was firm, and the closing price on February 27 was 10.90¢.

Consumption of cotton in domestic mills during January totaled 843,274 bales, a new all-time record for any month, according to the Census Bureau. The figure was 65,000 bales in excess of the previous record established in March, 1937, and compares with 775,472 bales used in December and 731,793 consumed in January, 1940. The large January consumption, brought about by heavy government and civilian demand for cotton cloth, carried the total consumption for the first six months of the cotton season to a new high record of 4,427,291 bales, against 4,041,936 a year ago. January exports of cotton dropped to 52,184 bales from the 107,375 shipped in December. In January, 1940, 1,035,416 bales were exported. Exports for six months were 654,949 against 4,169,831 a year ago.

The British Government announced last month that it would take over all responsibility for raw cotton importations and that merchants would merely act as handling agents for the cotton controller. This was taken to mean that the Liverpool exchange would have to close for the remainder of the war. Later reports indicated that the government might modify its position to enable the exchange to remain open.

The British Ministry of Supply was reported to have purchased the entire unsold surplus of Peru's 1940 crop, estimated at about 100,000 bales. The same policy was expected to be extended to Brazil and possibly to other countries in order to strengthen the economic blockade. Following this action, a resolution was adopted by the National Cotton Council urging England to purchase American rather than South American cotton. It is doubtful that Washington will support such a plea. There has been some talk in Washington about the possibility of placing cotton under an export licensing system to prevent the fiber from reaching Germany, which would be in line with British South American purchasing policy. Also the administration probably would not care to promote dissatisfaction in South America by attempting to curtail its export trade.

In England last month it was announced that on April 1 cotton avail-

able for the domestic trade would be reduced to 20% of normal. The reasons for this action were not so much because of a lack of cotton as making possible the release of cotton mill hands for work in war industries.

According to the *Journal of Commerce*, one large tire manufacturing company which buys direct from cotton producers is credited with having purchased fully 40% of the entire cotton loan holdings in Arkansas.

Fabrics

The fabrics market last month featured a continued broad demand for cloths of all construction types. With the larger part of mill output engaged well into the summer, a tight supply position is in evidence, and buyers are finding it increasingly difficult to find cloth for spot or nearby delivery. Defense purchases are expected to increase noticeably in the next few months, and mills were endeavoring to arrange schedules that would enable procurement of cloth by the defense forces without the imposition of priorities. Producers in general have been reluctant to accept orders beyond mid-summer. In view of the current civilian and defense demands, there is every indication that 1941 will break all records in cloth consumption. The general demand for sheetings was excellent, with heavy types particularly active as a result of the scarcity of burlap from Calcutta. Although this is usually an off-season for raincoats, manufacturers were reported to be experiencing good business.

The market continues to reflect the active demand with the following groups showing advances over last month's quotations: drills, osnaburgs, sheetings, tire fabrics, and ducks, with the exception of hose and belting, which held steady. Hollands held steady, and raincoat fabrics were easier, except print cloth, which advanced. Continuance of the present upward trend in prices is anticipated in view of current conditions.

Current Quotations

(Continued from page 80)

Synthetic Rubber

Neoprene Type E.....	lb.	.65
G.....	lb.	.70
GN.....	lb.	.65
I.....	lb.	.70
KN.....	lb.	.75
M.....	lb.	.65
Latex Type 56.....	lb.	.30
57.....	lb.	.30
Synthetic 190.....	lb.	.53

Tackifier

B.R.H. No. 2.....	lb.	.017 / .02
Staybelite.....	lb.	

Vulcanizing Ingredients

Sulphur.....	100 lbs.	2.00
Chloride (drums).....	lb.	.04
Telloy.....	lb.	1.75
Vandex.....	lb.	1.75

(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky.....	lb.	
2 N.C.....	lb.	
3 N.C.....	lb.	
1 Yellow.....	lb.	
2.....	lb.	
Montana, crude.....	lb.	

New York Quotations

February 24, 1941

Drills

38-inch 2.00-yard.....	yd.	\$0.14 1/2
40-inch 3.47-yard.....	yd.	.08 1/2
50-inch 1.52-yard.....	yd.	.20 1/2
52-inch 1.85-yard.....	yd.	.17 1/2
52-inch 1.90-yard.....	yd.	.16 1/2 / 1.67 1/2
52-inch 2.20-yard.....	yd.	.15 1/2
52-inch 2.50-yard.....	yd.	.14
59-inch 1.85-yard.....	yd.	.17

Ducks

38-inch 2.00-yard D. F.....	yd.	.14 1/2 / 1.15 1/2
40-inch 1.45-yard S. F.....	yd.	.20
51 1/2 -inch 1.35-yard D. F.....	yd.	.22 1/2
72-inch 1.05-yard D. F.....	yd.	.31 / .31 1/2
72-inch 2.17 ounce.....	yd.	.34 1/2

Mechanicals

Hose and belting.....	lb.	.30
Tennis		
51 1/2 -inch 1.35-yard.....	yd.	.23 1/2
51 1/2 -inch 1.60-yard.....	yd.	.20

Hollands

Gold Seal and Eagle		
20-inch No. 72.....	yd.	.10 1/2
30-inch No. 72.....	yd.	.19 1/2
40-inch No. 72.....	yd.	.21 1/2
50-inch No. 72.....	yd.	.29 1/2
Red Seal and Cardinal		
20-inch.....	yd.	.09 1/2
30-inch.....	yd.	.17 1/2
40-inch.....	yd.	.18 1/2
50-inch.....	yd.	.27 1/2

Osnaburgs

40-inch 2.34-yard.....	yd.	.12 1/2
40-inch 2.48-yard.....	yd.	.11 1/2
40-inch 2.56-yard.....	yd.	.10 1/2
40-inch 3.00-yard.....	yd.	.09 1/2
40-inch 7-ounce part waste.....	yd.	.10 1/2
40-inch 10-ounce part waste.....	yd.	.14 1/2
37-inch 2.42-yard.....	yd.	.12

Raincoat Fabrics

Cotton		
Bombazine 60 x 64.....	yd.	.08 1/2
Plaids 60 x 48.....	yd.	.11 1/2
Surface prints 60 x 64.....	yd.	.12 1/2
Print cloth, 38 1/2 -inch, 60 x 64.....	yd.	.05 1/2
Sheetings, 40-Inch		
48 x 48, 2.50-yard.....	yd.	.09 1/2
64 x 68, 3.15-yard.....	yd.	.09 1/2
56 x 60, 3.60-yard.....	yd.	.08 1/2
44 x 40, 4.25-yard.....	yd.	.06 1/2
Sheetings, 36-Inch		
48 x 48, 5.00-yard.....	yd.	.05 1/2
44 x 40, 6.15-yard.....	yd.	.04 1/2

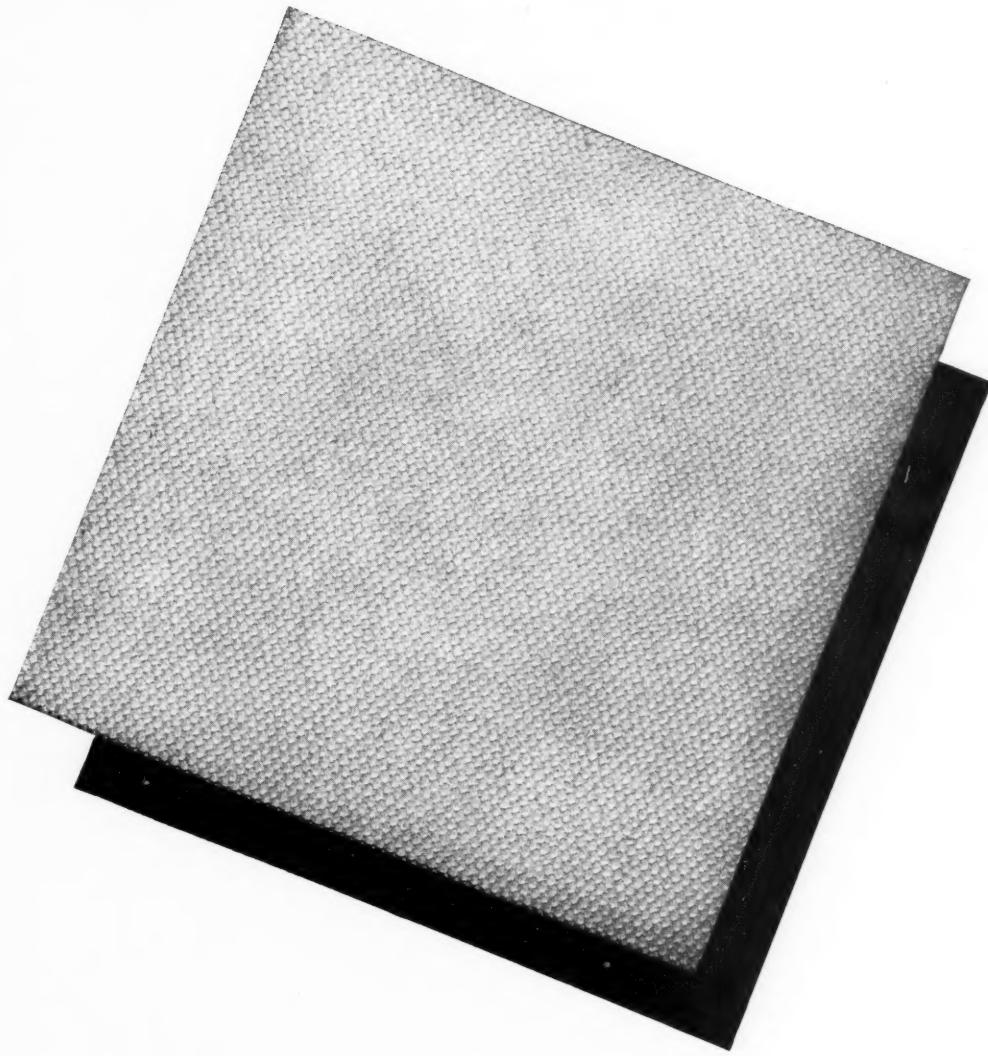
Tire Fabrics

Builder		
17 1/2 ounce 60" 23/11 ply Karded peeler.....	lb.	.30
9 1/2 ounce 60" 10/2 ply Karded peeler.....	lb.	.29 1/2
9 1/2 ounce 60" 10/2 ply Karded peeler.....	lb.	.29
Cord Fabrics		
23/5/3 Karded peeler, 1 1/2" cotton.....	lb.	.30 1/2
15/3/3 Karded peeler, 1 1/2" cotton.....	lb.	.28 1/2
12/4/2 Karded peeler, 1 1/2" cotton.....	lb.	.27 1/2
23/5/3 Karded peeler, 1 1/2" cotton.....	lb.	.36
23/5/3 Combed Egyptian.....	lb.	.49 1/2
Leno Breaker		
8 1/2 ounce and 10 1/2 ounce 60" Karded peeler.....	lb.	.32

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	INQUIRY
2825	Manufacturers of beauty and barbers' combs.
2826	Suppliers of dibutyl phthalate.
2827	Manufacturers of hollow rubber balls 1/2 to one inch in diameter.
2828	Manufacturers of vulcanizing pans.
2829	Manufacturers of rubber ear plugs for swimmers.
2830	Manufacturers of bicycle handle grips.
	Supplies of sponge rubber in slab form.



SHAWMUT MILL
EXTRA
BELTING DUCK

MORE POWER TO AMERICAN INDUSTRY

Through constant cooperation with engineers of the rubber industry, our mills have developed belting fabrics scientifically designed for longer wear and greater efficiency. Shawmut Belting Duck — like other fabrics we provide for your use — is known throughout the trade for its excellent performance in the job.

WELLINGTON SEARS COMPANY
65 WORTH STREET, NEW YORK, N. Y.

Patents and Trade Marks

APPLICATION

United States

2,229,047. **Foot Plate for Passageway between Articulated Vehicle Units.** A. Christianson, Hammond, Ind., and N. B. Johnson, assignors to Pullman-Standard Car Mfg. Co., both of Chicago, Ill.

2,229,133. **Cylinder with Rubber Printing Plate for Printing.** L. M. Sands, assignor to Rotary Printing Co., both of Norwalk, O.

2,229,170. **Golf Ball with Balanced Filled Core.** C. W. Greene, assignor to DeVilbiss Co., both of Toledo, O.

2,229,179. **Road Safety Marker Comprising Reflector Lens Embedded in Rubber.** J. D. Langdon, Los Angeles, Calif.

2,229,210. **Pressure-Sensitive Adhesive Tape.** Utilizing a Separator Coat of Ethyl Cellulose. P. Van Cleef, assignor, by mesne assignments, to Van Cleef Bros., both of Chicago, Ill., a partnership composed of N. F., and P. Van Cleef.

2,229,317. **Waterproof Panel Joint.** P. Van Cleef, assignor to Van Cleef Bros., both of Chicago, Ill., a partnership consisting of N. F., and P. Van Cleef.

2,229,375. **Drain Pipe Cleaner.** W. F. Eggleston, Oklahoma City, Okla.

2,229,377. **Universal Electrical Socket Device.** H. G. Friang, Madison, Wis., assignor to Ray-O-Vac Co., a corporation of Wis.

2,229,379. **Rubber Valve Stem.** A. Keefe, Akron, O., assignor to F. H. Watson Co., Jonesboro, Ark.

2,229,388. **Rubber-Encased Foot for Typewriters, Etc.** R. G. Thompson, West Hartford, Conn., assignor to Remington Rand, Inc., Buffalo, N. Y.

2,229,406. **Grooved Shoe Sole.** D. R. Cutler, Braintree, assignor to Alfred Hale Rubber Co., Quincy, both in Mass.

2,229,411. **Safety Cradle with Suction Cup Attachment.** T. A. Hughes, Shaker Heights, O.

2,229,439. **Nursing Doll.** J. Brock, Brooklyn, assignor to American Character Doll Co., Inc., New York, both in N. Y.

2,229,503. **Spats for Children's Shoes.** A. Greenstein, Brooklyn, N. Y.

2,229,575. **Waterproof Bath Protector with Elastic Retaining Band for Artificial Limbs.** A. Kaplan, Ardmore, Pa.

2,229,577. **Rubber Heel and Means for Attachment.** C. E. Lewis, Corson County, S. D.

2,229,579. **Preserving Air Bags by Injecting Therein Polymerized Isobutylene.** (Synthetic.) F. H. Manchester, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,229,589. **Elastic Top Stocking.** H. McAdams, assignor to Nolde & Horsz Co., both of Reading, Pa.

2,229,593. **Garment Attachment.** J. Russo, Charlotte, N. C.

2,229,602. **Ferrous Metal Food Can Lined with Rubber Chloride Composition.** J. W. Raynolds, Pittsburgh, Pa., assignor to Raolin Corp., New York, N. Y.

2,229,718-2,229,720. **Windshield Wiper.** G. Bramming, assignor, by mesne assignments, to Productive Inventions, Inc., both of Gary, Ind.

2,229,739. **Hypodermic Syringe Cartridge.** W. E. Harrington, Charleroi, Pa.

2,229,749. **Fountain Pen.** F. E. Little, Massillon, O.

2,229,750. **Shock Absorber.** M. J. Lindstrom, Congress Park, Ill., assignor to W. H. Miner, Inc., Chicago, Ill.

2,229,794. **Contact Plug.** A. Brownstein, Bridgeport, Conn., assignor to Electrix Corp., Pawtucket, R. I.

2,229,837. **Protector Glove for Linemen's Rubber Gloves.** T. R. Claffy, Chicago, Ill.

2,229,849. **Insulating Splice Cover.** A. O. Heidebrecht, Burron, Kan.

2,229,880. **Abrasive Article Comprising Abrasive Particles and a Bond Containing a Thermosetting Resin and a Cross Polymer of Butadiene and Acrylic Acid Nitrile.** (Synthetic.) H. V. Allison, Fairfield, assignor to Allison Co., Bridgeport, both in Conn.

2,229,900. **Circuit Breaker.** M. G. Sateren, West Springfield, Mass., assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

2,230,029. **Load Stabilizer for Well Pumping Equipment.** J. F. Eaton, assignor to Engineering Co., both of Tulsa, Okla.

2,230,043. **Punch Stripper with Rubber Enclosed Shank.** H. M. Moran, assignor to Ready Machine Tool & Die Co., Inc., both of Connersville, Ind.

2,230,068. **Apparatus Including Air Inflatable Cuff to Treat Vascular Diseases.** R. J. Roensch, Milwaukee, Wis.

2,230,086. **Protective Device for Electric Blasting Initiator.** C. R. Johnson, Glenn Mills, and C. A. Woodbury, Media, both in Pa., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,230,114. **Nursing Doll.** A. M. Katz, Brooklyn, assignor to Ideal Novelty & Toy Co., Long Island City, both in N. Y.

2,230,150. **Disposable Bag Catheter.** G. L. Winder, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

2,230,218. **Gastro-Intestinal Treatment System.** W. F. Asche, Chicago, Ill.

2,230,226. **Catheter.** J. M. Auzin, Warwick, R. I., assignor to Davol Rubber Co., a corporation of R. I.

2,230,277. **Circuit Breaker.** E. Volker, Berlin-Friedenau, and K. Kobligh, Berlin-Wilmersdorf, assignors to Deutsche Waffen- und Munitionsfabriken, A.G., Hauptverwaltung, Berlin-Charlottenburg, all in Germany.

2,230,291. **Stretchable Waterproof Legging** for Attachment to Rubber Shoe. C. L. Evans, New York, N. Y.

2,230,303. **Sealing Strip for Spaced-Apart Pavements.** C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,230,330. **Water-Tight Watchcase.** F. Marti, La Chaux de Fonds, Switzerland.

2,230,333. **Auto Bumper Cushioning Device.** M. E. Painter, Brookville, O.

2,230,350. **Submerged Dishwasher with Suction-Cup Supports.** G. T. Fielding, Stamford, Conn.

2,230,380. **Legging with Elastic Band Supporting Means.** E. A. Johst, New York, N. Y.

2,230,402. **Elastic-Topped Knitted Stocking.** J. L. Getaz, Maryville, Tenn.

2,230,406. **Anti-Slip Device.** C. B. Johnson, Eau Claire, Wis.

2,230,421. **Pipe Hanger for a Well Head.** M. T. Works, assignor to Cameron Iron Works, both of Houston, Tex.

2,230,489. **Squeegee.** A. and M. Grossfeld, assignors to Forway Squeegee Mfg. Co., Inc., all of New York, N. Y.

2,230,521. **Signal Light.** C. M. Bolser, Cedar Falls, Iowa.

2,230,583. **Squeegee.** M. Borden, New York, N. Y.

2,230,598. **Doorstop.** E. W. Mason, Wortendyke, Baldwin, N. Y., assignor of one-half to A. Stirrat, N. J.

2,230,613. **Flush Valve.** G. F. Deady, Dayton, O.

2,230,626. **Means to Recover Cemented Well Casings.** J. B. H. Miller, Oklahoma City, Okla.

2,230,636. **Abdominal and Rupture Support.** A. L. Austin, Cleveland, O.

2,230,658. **Electrical Contact Plug Receptacle.** J. S. Stull, Chicago, Ill.

2,230,688. **Pavement Expansion Joint.** G. J. Irwin, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,230,712. **Well Bridging Plug.** W. Bendeler and C. Howard, both of Oklahoma City, Okla.

2,230,723. **Hose with Welt and Warp Reinforcing Structure.** A. D. MacLachlan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,230,725. **Fluid Sealing Structure.** T. D. Nathan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,230,744. **Sheave for Supporting Elevator Doors.** J. R. Disbro, Lakewood, assignor to W. S. Tyler Co., Cleveland, both in O.

2,230,885 and 2,230,886. **Wringer, Etc.** W. L. Kauffman, II, assignor to Lovell Mfg. Co., both of Erie, Pa.

2,230,887 and 2,230,888. **Flameproofed Electric Cable.** (Synthetic.) W. F. Lamela, East Paterson, assignor to Okonite Co., Passaic, both in N. J.

2,230,985. **Sealing Strip.** G. W. Gail, Ruxton, assignor to G. W. Gail, Inc., Baltimore, both in Md.

Dominion of Canada

393,833. **Railway or Tramway Crossing with Resilient Mounting.** T. P. Strickland and A. T. O'Meara, co-inventors, both of Camberwell, Victoria, Australia.

393,872. **Road Surface Marking Block.** P. Shaw, Halifax, Yorkshire, England.

393,885. **Sweat Band.** American Allsafe Co., Inc., assignee of W. F. Sterne, both of Buffalo, N. Y., U. S. A.

393,892. **Snubber.** American Steel Foundries, assignee of A. H. Oelkers, both of Chicago, Ill., U. S. A.

393,897. **Container Siphon and Dispensing Means.** Baxter Laboratories, Inc., assignee of Falk-Baxter, Inc., assignee of N. M. Nessel, all of Glenview, Ill., U. S. A.

393,971. **Railway Tie Plate.** Resilient Products Corp., assignee of T. W. Stedman, both of New York, N. Y., U. S. A.

393,989. **Laminated Floor Material.** Woodall Industries, Inc., assignee of G. R. Cunningham, both of Detroit, Mich., U. S. A.

393,992. **Rubber-Covered Bumper Clip.** (Latex.)

Collard, Inc., Detroit, Mich., and United Carr Fastener Corp., Cambridge, Mass., each an assignee of one-half of the interest of J. A. Bumpus, Pleasant Ridge, and C. S. Christiansen, Detroit, co-inventors, both in Mich., all in the U. S. A.

394,014. **Hydraulic Braking System.** J. A. Derrig, Mt. Prospect, Ill., U. S. A.

394,019. **Harvester Reel.** J. S. Green, Terra Bella, Calif., U. S. A.

394,047. **Latex Garment.** A. N. Spanel, Rochelle, N. Y., U. S. A.

394,097. **Self-Cleaning Tractor Tire.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of J. E. Hale, Akron, O., U. S. A.

394,110. **Screen Cloth with Rubber Edges.** Jeffrey Mfg. Co., Columbus, O., assignee of R. D. Heller, Boise, Idaho, both in the U. S. A.

394,124. **Matrix for Electroforming Foraminous Sheets.** Edward O. Norris, Inc., New York, N. Y., assignee of E. O. Norris, Westport, Conn., both in the U. S. A.

394,270. **Endless V-Belt.** Gates Rubber Co., assignee of E. Nassimbene, both of Denver, Colo., U. S. A.

394,295. **Vehicle Stabilizer with Rubber Block Supports.** Monroe Auto Equipment Co., assignee of B. D. McIntyre, both of Monroe, Mich., U. S. A.

394,298. **Railway Car Draft Rigging with Rubber Abutment Blocks.** National Malleable & Steel Castings Co., assignee of W. J. Metzger, both of Cleveland, O., U. S. A.

394,315. **Sound Locator Apparatus with Rubber Vibration Insulator.** Sperry Gyroscope Co., Inc., Brooklyn, assignee of F. R. House, Baldwin Harbor, both in N. Y., U. S. A.

394,338. **Rubber Thread** Having a Core Surrounded by a Plurality of Rubber Filaments. International Latex Processes, Ltd., St. Peter Port, Channel Island, assignee of R. G. James, Birmingham, Warwickshire, England.

394,385. **Rubber Mattress of Cellular Structure.** N. D. Mattison, Montclair, N. J., U. S. A.

394,406. **Tire Tread Containing Granular Material Bonded to Rubber.** Edward G. Budd Mfg. Co., assignee of P. Tarbox, both of Philadelphia, Pa., U. S. A.

394,429. **Suction Cleaner.** Hoover Co., North Canton, assignee of D. G. Smellie, Canton, both in O., U. S. A.

394,506. **Rivet Remover with Rubber-Covered Washers.** R. Temple, Jr., Pittsburgh, Pa., U. S. A.

394,548. **Vehicle Spring Suspension with Rubber Socket.** General Motors Corp., Detroit, assignee of B. H. Anibal, Pontiac, both in Mich., U. S. A.

394,575. **Synchronous Electric Motor with Rubber Bushing between Rotor and Oscillatory Arm.** S. Smith & Sons (Motor Accessories), Ltd., assignee of V. J. S. Russell, both of London, England.

United Kingdom

529,649. **Electric Communication Cables.** Standard Telephones & Cables, Ltd., J. F. Morley, and D. Nunn.

529,726. **Sleeve Protectors for Earth-Boring Drills.** Leyland & Birmingham Rubber Co., Ltd., H. J. Butcher, and R. W. Lunn.

529,981. **Electric Communication Cables.** Standard Telephones & Cables, Ltd., G. O. Probert.

530,063. **Insulated High-Tension Electric Wires or Cables.** J. Drennan.

530,066. **Rubber-Soled Footwear.** British Tire & Rubber Co., Ltd., H. Skelton, and F. Wray.

530,067. **Supports for Golf-Club Bags.** British Tire & Rubber Co., Ltd., and T. A. Beazley.

530,103. **Adhesive Material.** Durex Abrasives, Ltd., and C. H. Corwin.

530,158. **Resilient Wheels.** Svenska Aktiebolaget Bromsregulator.

530,281. **Outer Case for Game Ball with Inflatable Bladder.** J. H. Van Der Poel and A. Stolk.

530,297. **Protective Coverings for Flexible Electric Leads, Etc.** Compressed Rubber Products, Ltd., W. H. Fawkes, and J. A. Gurdan.

530,394. **Seat Construction.** Firestone Tire & Rubber Co., Ltd.

530,512. **Electric Cables.** British Insulated Cables, Ltd., and H. B. Chapman.

530,577. **Insulation of Electric Cables or Apparatus.** Standard Telephones & Cables, Ltd., T. R. Scott, and A. J. Warner.

530,630. **Rubber Springs.** Soc. Italiana Pirelli.

530,692. **Windshield Wipers.** W. E. O'Shea.

530,879. **Inking Drums for Printing Machines, Etc.** Ferma, Ltd., F. K. Wertheimer, and L. A. Schofield.

530,955. **Foundation Garments.** Berger Bros. Co. Houston Co., Ltd.

530,966. **Insulation Material.** British Thomson-Houston Co., Ltd.

530,975. **Platen Printing Machines.** Soldans, Ltd., and B. R. Dockree.

531,998. **Tires.** H. Westphalen.

531,065. **Electric Power Cables.** Soc. Italiana Pirelli.

531,066. **Joints for Electric Cables.** Soc. Italiana Pirelli.

531,123. **Insulation of Electric Conductors.** British Thomson-Houston Co., Ltd., and R. Newbound.

531,270. **Insulating Material.** British Thomson-Houston Co., Ltd.

531,273. **Insulated Electric Conductors.** British Thomson-Houston Co., Ltd.

531,335. **Warp Knitted Fabrics** Provided with Rubber Warp Threads Forming Meshes in Spots. P. Schonfeld.

531,338. **Electric Power Cables.** Standard Telephones & Cables, Ltd.

531,384. **Girdle.** Neatform Co., Inc.

531,474. **Rubber and Like Buffers.** Hermetic Rubber Co., Ltd., and G. F. Colledge.

531,518. **Belts.** Raybestos-Manhattan, Inc.

531,597. **Foundation Garments.** L. J. A. Amyot.

531,622. **Insulated Electrical Conductors.** Pirelli-General Cable Works, Ltd., and H. Barron.

531,752. **Power Wringers, Etc.** Lovell Mfg. Co.

531,761. **Clothes Wringers.** British Thomson-Houston Co., Ltd.

531,789. **Cordrey and Like Apparel.** R. & W. H. Symington & Co., Ltd., and S. Allbright.

531,814. **Insulation of Electrical Apparatus** Particularly for Trolley Buses. General Electric Co., Ltd., and E. H. Croft.

Germany

699,902. **Ventilator** with Blades of Flexible Material, as Rubber. Samson United Corp., Rochester, N. Y., U. S. A. Represented by J. Apitz, F. Reinhold, and H. Sauerland, all of Berlin.

700,142. **Tube-Shaped Mold Core of Rubber.** E. G. L. Girard, Paris, France. Represented by M. Eule, Berlin, and G. Lottermos and A. von Kreisler, both of Frankfurt a.M.

PROCESS

United States

2,229,582. **Filtering Flocculated Rubber Latex Aggregates** Which Comprises Removing Liquid from a Slurry of These Aggregates through a Filter Cloth Composed Substantially Entirely of Rayon. J. A. Merrill, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,229,878. **Repairing Tires.** R. F. Wilson, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,229,879. **Making a Porous Abrasive Article by Stabilizing a Concentrated Latex, Adding a Vulcanizing Agent, Adding Abrasive Grain, and Shaping Articles from This Mixture in a Fixed Capacity Mold. (Latex.)** H. V. Allison, Fairfield, assignor to Allison Co., Bridgeport, both in Conn.

2,229,885. **Rubber Fenders.** P. P. Crisp, Stow, and W. E. Haggan, assignors to Firestone Tire & Rubber Co., both of Akron, all in O.

2,230,128. **Contoured Floor Coverings** with Surface Designs. G. W. Blair and J. F. Schott, assignors to Mishawaka Rubber & Woolen Mfg. Co., all of Mishawaka, Ind.

2,230,138. **Stretchable Hollow Rubber Article Having Edge Portions of Different Elastic Modulus from Body Portions.** R. H. Ewart, Nutley, N. J., assignor to United States Rubber Co., New York, N. Y.

2,230,151. **Distensible Bag Catheters. (Latex.)** G. L. Wilder, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

2,230,192. **Rubber Article.** W. C. Ross, Winchester, and A. P. Rehbock, Cambridge, assignors to Dewey & Almy Chemical Co., North Cambridge, all in Mass.

2,230,289. **Making a Rubber-Covered Roll** by Assembling a Plurality of Vulcanized Sponge Rubber Cushion Sections about a Shaft, Applying a Cover of Soft Rubber Composition, and Mold Vulcanizing the Cover. H. M. Dodge, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,230,388. **Laying in Elastic Yarn on Cotton Type of Knitting Machine.** N. Schwartz, Upper Darby, Pa.

2,230,403. **Knitting Process and Incorporation of an Elastic Yarn.** J. L. Getaz, Maryville, Tenn.

2,230,879. **Manufacturing Rubber Tire Tube and Valve Stem as an Integrated Unit.** A. E. Bronson, Shaker Heights, assignor to Dill Mfg. Co., Cleveland, all in O.

Dominion of Canada

394,259. **Coloring Meteorological Balloons** by Introducing a Dry Pigment and Distributing over the Interior Wall. Dewey & Almy Chemical Co. of Canada, Ltd., Ville La Salle, P. O., assignee of A. P. Rehbock, Belmont, Mass., U. S. A.

394,273. **Adhering Polyvinyl Chloride to Metal** by Covering the Metal with at Least One Coat of Chlorinated Rubber Cement and Superposing at Least One Coat of a Solution of Polyvinyl Chloride (Synthetic). B. F. Goodrich Co., New York, N. Y., assignee of S. L. Brous, Akron, O., both assignees of U. S. A.

394,366. **Double Chamber Tire Tube.** G. C. Arey, Fort Thomas, Ky., U. S. A.

United Kingdom

529,860. **Multi-Filament Rubber Thread.** International Latex Processes, Ltd.

530,011. **Bonding Rubber to Fibrous Materials.** United States Rubber Co.

530,058. **Electric Cables.** Standard Telephones & Cables, Ltd., W. K. Weston, and W. J. L. Wildbore.

530,204. **Firmly Uniting Rubber with Inserts or Applied Layers of Fibrous Material.** Gummiwerke Fulda A.G.

530,721. **Microporous Rubber Sheets, Tubes, Etc.** Chloride Electrical Storage Co., Ltd., and B. Heap.

530,907. **Porous Rubber Products and Compositions** Adapted for Use in Such Manufacture. B. F. Goodrich Co.

531,806. **Sponging Rubber or Similar Materials.** A. J. Cordeve.

Germany

696,642. **Pneumatic Tires with Two or More Steel Cables in Each Bead.** Deka Pneumatik G.m.b.H., Berlin.
 699,849. **Improving Thermal Degradation of Synthetic Rubber in the Form of Sheets.** Continental Gummi-Werke, A.G., Hannover.
 700,058. **Knitted Goods with Rubber Warp Threads.** P. Schonfeld, Chemnitz.
 700,391. **Pneumatic Tire with Sponge Rubber Insert.** H. Westphalen, Neumunster.

700,390. Hollow Roll for Working Rubber, Etc.
H. Meyer, Hannover.
700,899 and 700,890. Device and Method to
Make Rubber Thread. Société Internationale
de Participations Industrielles & Commer-
ciales S.A., Luxembourg. Represented by A
Mayer, Berlin.

CHEMICAL

United States

2,229,356. **Waterproof Coating Composition** Comprising Paraffin Wax and a Polymer of Isobutylene. (Synthetic.) P. J. Wiezevich, Elizabeth, N. J.; now by judicial change of name P. J. Gaylor, assignor to Standard Oil Development Co., a corporation of Del.

2,229,534. **Rubber Powder** Containing Carbon Black, Prepared by Adding to Latex, Carbon Black and not over 10% on the Rubber of an Inorganic Water Soluble Silicate, Flocculating with an Acidic Salt of Aluminum, Forming a Moist Cake, Disintegrating the Cake to a Powder, and Drying. (Latex.) C. W. Walton, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.

2,229,537. **Antioxidant-Reaction Product** of an Aryl Tetrahydro Naphthylamine and a Ketone. W. D. Wolfe, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.

2,229,549. **An Emulsion** Comprising a Solution of a Condensation Derivative of Rubber and a Solution of a Resinous Material. C. M. Carson, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.

2,229,562. **Preparation of Zinc Dithiocarbamates.** A. J. Gracia, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.

2,229,652. **Producing Butadiene** by Heating above 100° C. and under Pressure of a Compound of Formula $\text{CH}_2=\text{CHO}-\text{CH}=\text{CH}_2$ or Where R is Hydrogen, $\text{CH}_2=\text{CH}-\text{CHOH}-\text{CH}_3$, or Mixtures Thereof, and an Aqueous Solution of a Dehydration Catalyst. (Synthetic.) P. Halbig, Munich, N. Platzer, Burghausen, and A. Trieb, assignors to Consortium für Elektrochemische Industrie G.m.b.H., both of Munich, all in Germany.

2,229,661. **Producing High Molecular Weight Polymers** from Isobutylene by Adding the Liquid Olefin to a Reaction Zone, Providing at least Three Gallons of Propane per Gallon of Olefin, Bubbling Boron Fluoride through the Liquid, and Agitating for a Short Time to Bring about Polymerization, meanwhile Maintaining the Temperature below -20° C. by Evaporation of Propane. (Synthetic.) M. D. Mann, Jr., Roselle, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,229,882. **Coating Composition** Prepared by Adding Water and a Solution of Chlorinated Rubber, Chlorinated Rubber Hydrochloride, or Rubber Hydrochloride in a Water Immiscible Solvent, in the Presence of an Emulsifying Agent. J. Binapf, E. Bock, and F. Frick, all of Krefeld-Uerdingen, and O. Jordan, Mannheim, assignors to I. G. Farbenindustrie A.G., Frankfurt a.M., all in Germany.

229,985. **Water-, Ozone-, and Age-Resisting Electrical Insulating Composition** Comprising Chlorinated Ethyl Ester of Acrylic Acid, Polymerized Used Rubber, Sulphur, a Filler, and an Absorbent. (Synthetic.) P. Nowak, Berlin-Charlottenburg, and W. Dietloff, Berlin-Johannisthal, both in Germany, assignors to General Electric Co., a corporation of N. Y.

230,000. **Polyvinyl Chloride Composition** for Sheets Comprising a Uniform Mat Mixture of After-Chlorinated Polyvinyl Chloride and Polyvinyl Chloride or Polystyrene. (Synthetic.) O. Hauffe and W. Wehr, assignors to Deutsche Celluloid-Fabrik, all of Eilenburg, Germany.

230,335. **Pigment Composition** Adapted to Disperse Rapidly on Addition to Water Comprising a Pigment and a Soluble Salt of an Acid Alkyl Ester. J. G. Kern, Buffalo, assignor to National Aniline & Chemical Co., Inc., New York, both in N. Y.

230,359. **Rubber Derivative** Produced by Reacting Unmilled Undissolved Rubber at above 125° C. in Liquid Cresol (75 to 100 Parts by Weight of Rubber) in the Presence of Hydrogen Chloride. J. P. McKenzie, Calumet City, Ill., assignor to Marbon Corp., Gary, Ind.

230,641. **Ion Exchange Process** to Remove Particular Constituents from Fluids by Absorption. D. M. Findlay, Passaic, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

230,729. **Plasticizing Rubber** by Dispersing Synthetic Antioxidant into the Rubber on a Rubber Mill without Breaking Down the Rubber Structure, and Subjecting the Resulting Product in a Closed Vessel to Superatmospheric Pressure While in the Presence of Non-Oxidizing Compressible Fluid Comprising Water Vapor. M. H. Savage and F. C. Sparge, both of New Haven, and E. W. Schwartz, Bridgeport, all in Conn., assignors to General Electric Co., a corporation of N. Y.

2,230,894. Treatment of Synthetic Rubber-Like Material Which Comprises Exposing at an Elevated Temperature Emulsion Polymers of Butadiene-1,3-Hydrocarbons to an Oxidizing Treatment by Means of Oxygen in the Presence of Antioxidants and of Hydrazones. W. Gumlich, Leverkusen-Schlebusch, Rhine, Germany, assignor, by mesne assignments, to Jasco, Inc., a corporation of La.

Dominion of Canada

393,923. Vinyl Resin Light Stabilizer—Antimony Oxide, Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of A. K. Doolittle, South Charleston, W. Va., U. S. A.

394,173. Rubber-Like Product. Produced by Polymerizing Butadiene or Its Substitution Products in the Presence of Solid Highly Polymerized Isobutylene. (Synthetic.) I. G. Farbenindustrie A.G., Frankfurt a.M., assignee of M. Mueller-Cunradi and W. Daniel, co-inventors, both of Ludwigshafen-on-Rhine, all in Germany.

394,174. Rubber-Like Product. Produced by Polymerizing Vinyl Carbazole in the Presence of Solid Highly Polymerized Isobutylene. I. G. Farbenindustrie A.G., Frankfurt a.M., assignee of M. Mueller-Cunradi and W. Daniel, co-inventors, both of Ludwigshafen-on-Rhine, all in Germany.

394,253. Coloring Articles of Copolymers of Vinyl Chloride and Vinyl Acetate by Immersion in a Bath of Dye Dissolved in Acetone and Methanol. (Synthetic.) Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of C. N. Smith, Rocky River, O., U. S. A.

394,419. Corrosion Resistant Paint Comprising Chlorinated Rubber and Depolymerized Vulcanized Rubber in Solution. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. J. Reid, Fair Lawn, N. J., U. S. A.

394,467. Heat Stabilizing High Molecular Weight Saturated Linear Hydrocarbon Polymers. Normally Subject to Depolymerization at Elevated Temperatures, by Incorporating Therein 0.01 to 5% of Thio-Phenolic Compound. (Synthetic.) Standard Oil Development Co., Linden, assignee of R. Rosen, Elizabeth, and R. M. Thomas, Union, all in N. J., U. S. A.

394,473. Vulcanizing Agent—Reaction Product of Formaldehyde, a Primary Aromatic Amine, and a Mercaptocetyl Thiazole. Wingfoot Corp., Wilmington, Del., assignee of W. Scott, Akron, O., both in the U. S. A.

United Kingdom

529,838. Plasticizing Rubber Substitutes. E. I. du Pont de Nemours & Co., Inc.

529,839. Sulphur Polymerized Chloroprene. (Synthetic.) E. I. du Pont de Nemours & Co., Inc.

529,842. Preparation of Nitriles. Wingfoot Corp., P. H. Sykes, and Imperial Chemical Industries, Ltd.

530,697. Adhesive Compositions. United States Rubber Co.

530,696. Preservation of Latex. Monsanto Chemical Co.

531,195. Stabilization of Aqueous Dispersions of Polymerized Halogenated Dienes. (Synthetic.) E. I. du Pont de Nemours & Co., Inc.

531,218. Antioxidants. United States Rubber Co.

531,361. Crude Rubber and Method of Making Same. United States Rubber Co.

531,721. Vulcanization of Rubber. American Cyanamid Co.

531,723. Preparation of Softened Rubber. British Rubber Producers' Research Ass'n, (J. D. Hastings).

531,852. Production of Chlorinated Rubber. L. Mellersh-Jackson, (Hercules Powder Co.).

UNCLASSIFIED

United States

2,229,023. Tire Inflator. W. T. Amneus, Emeryville, Calif.

2,229,192. Tire Inflation Indicator. L. Schultz, Gardner, Ill.

2,229,251. Traction Device for Wheels Provided with Rubber Tires. E. Meili, Schaffhausen, assignor to A. H. Marx, Zollikonberg, Zurich, both in Switzerland.

2,229,269. Wringer Release Mechanism. A. W. Altorfer, Peoria, Ill.

2,229,287. Sole Protector for Rubber Boots. C. W. Parker, Lynn, Mass.

2,229,673. Machine for Covering an Elastic Filament with Yarn or Thread. G. Rosenfeld, assignor to Waverly Yarn Corp., both of Elizabeth, N. J.

2,229,724. Pneumatic Tire Wheel and Rim. F. W. Burger, Niles, and W. E. Schirmer, assignors to Clark Equipment Co., both of Buchanan, all in Mich.

2,229,967. Electric Cable. E. S. Flynn, Hastings-on-Hudson, assignor to Anaconda Wire & Cable Co., New York, both in N. Y.

2,230,042. Tire Grooving Tool. J. W. Mertens, Jr., Racine, Wis.

2,230,193. Pneumatic Tire Wheel. B. H. Shinn, Butler, Pa., assignor to Firestone Tire & Rubber Co., Akron, O.

2,230,291. Aspirator Coupling for Garden Hose. L. Hermann, assignor to Four Power Co., both of Cleveland, O.

2,230,347. Apparatus for Tensioning an Elastically Extensible Strand. P. M. Cole, Medaville, Pa., assignor to Western Electric Co., Inc., New York, N. Y.

2,230,596. Windshield Cleaner. E. C. Horton, Hamburg, assignor to Trico Products Corp., Buffalo, both in N. Y.

2,230,600. Tire Casing Repair Plug. H. G. Wedler, assignor to Kex Co., Inc., both of St. Louis, Mo.

2,230,906. Tire Pressure Indicator. C. P. Potts, Macon, Ga.

Dominion of Canada

393,863. Tire Stud. J. Montigny, St. Hyacinthe, P. Q., assignor to Western Electric Co., Inc.

394,198. Non-Skid Device. D. S. Kennedy, Andover, Hampshire, England.

394,261. Racquet Press. Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of G. Vaughan, Waltham Abbey, Essex, England.

United Kingdom

530,004. Automatic Tire Inflator. K. Brewster, 530,212. Guards for Presses, Etc. J. Hastings and Horstmann Gear Co., Ltd.

530,396. Anti-Skid Devices for Motor Vehicles. E. Monninghoff.

531,615. Manufacturers of Insulated Wire and Varnish for Use Therein. Schenectady Varnish Co., Inc.

531,763. Vehicle Wheels. Dunlop Rubber Co., Ltd., P. B. Chatterton, and G. E. Sharp.

531,767. Barrier-Joints for Electric Cables. Caledon's Cable & Construction Co., Ltd., and D. T. Hollingsworth.

531,769 and 531,845. Apparatus for Temporarily

Laying Electric Cables. E. A. Dennison and Kennedy & Kempe, Ltd. 531,847. Vessel-Welding Method and Apparatus. Firestone Tire & Rubber Co., Ltd. 531,866. Non-Slip Attachments for Vehicle Wheels. D. S. Kennedy.

Germany

700,010. Foamy Insulation Materials. Allgemeine Elektricitäts-Gesellschaft, Berlin. 701,038. Compound of Chlor-2-Butadiene. (1,3)-Rubber. Hercules Powder Co., Wilmington, Del., U. S. A. Represented by L. Sell and E. Schlumberger, both of Berlin.

TRADE MARKS

United States

384,383. Representation of two concentric triangles containing the words: "Triple S," "Safety," "Silence," "Service." Tires. McCreary Tire & Rubber Co., Borough of Indiana, Pa.

384,436. Vogue Craft. Footwear. Fashion Bootery, Seattle, Wash.

384,437. Representation of an X-ray of a foot arch superimposed on a natural bridge enclosed in two concentric circles containing the words: "Natural Bridge." Footwear. Cradock-Terry Shoe Corp., Lynchburg, Va.

384,489. Non-Chek. Synthetic rubber covered hose. Electric Hose & Rubber Co., Wilmington, Del.

384,515. Representation of a rectangle containing lightning flashes and the words: "Non Static." Tires. Dunlop Tire & Rubber Corp., Buffalo, N. Y.

384,567. Firestone Imperial. Automobile seat covers. Firestone Tire & Rubber Co., Akron, O.

384,575. Arraflex. Fabric processed to present a suede-like surface. Hood Rubber Co., Inc., Wilmington, Del.

384,587. Spectrafoam. Sponge rubber. Goodyear Tire & Rubber Co., Akron, O.

384,590. Rapolo. Waterproof fabrics containing no rubber of any kind. Goodyear Tire & Rubber Co., Akron, O.

384,635. Representation of two pennants containing the letters: "T" and "M" above the words: "Thom McAn Campus Walkers."

Shoes. Melville Shoe Corp., New York, N. Y.

384,670. Panix. Foundation garments. I. Newmann & Sons, Inc., New Haven, Conn.

384,683. Once Over. Foundation garments. Maiden Form Brassiere Co., Inc., New York, N. Y.

384,684. Presfil. Pencils, fountain pens, erasers, pen points. David Kahn, Inc., North Bergen, N. J.

384,704. Air-Flite. Rackets and golf balls. A. G. Spalding & Bros., Inc., Chicago, Mass.

384,706. Firestone. Ice skates. Firestone Tire & Rubber Co., Akron, O.

384,766. Lock-Air. Anti-leak fluid for inner tubes. Lockair Co., Inc., Mineola, N. Y.

384,820. Joseph. Footwear. I. N. Joseph, Evanston, Ill.

384,824. Glassicized. Footwear and hosiery. Miles Shoes, Inc., New York, N. Y.

384,836. Representation of a black bar, an ice block and the words: "Pittsburgh Ice-Cleat Tire Chains" enclosed in an oval formed by a tire chain. Tire chains and repair links. D. G. Schrar, doing business as The Pittsburgh Chain Co., the Standard Chain Co., and The Pittsburgh Truck Chain Co., Pittsburgh, Pa.

Shipments of Crude Rubber from Producing Countries—Long Tons

Malaya including Brunei and Year	Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Thailand	French Indo-China	Total	Philippines and Oceania	Nigeria (incl. Brit. Cameroons)	Other Africa	South America	Mexican Guayule	Grand Total	
1938 ..	372,000	298,100	49,500	8,500	6,700	9,500	17,800	41,600	59,200	862,900	2,000*	2,900	3,100	5,900*	15,300	2,800	894,900
1939 ..	376,755	372,046	61,028	9,241	6,616	11,864	24,014	41,753	65,219	968,536	2,079*	5,435	2,824	6,600*	16,094	2,861,004,429	
1940 ..	540,417	537,038	88,937	13,649	9,668	17,623	35,166	43,940	64,437	1,350,875	2,177*	6,356	2,758	7,200*	17,661	3,442	1,390,469
1940																	
Jan. ..	26,229	54,148	7,698	839	833	1,858	2,256	5,722	5,238	104,821	185	1,191	147	600	1,550	399	108,883
Feb. ..	45,651	37,958	8,946	2,030	892	1,164	2,678	4,302	6,931	110,557	94	1,477	234	600	1,662	239	113,863
Mar. ..	47,885	42,355	5,305	1,070	871	1,050	3,526	3,111	3,551	108,724	178	548	343	600	1,482	346	111,221
Apr. ..	24,607	44,416	4,144	817	990	1,799	2,951	1,834	2,927	84,485	203	598	120	600	1,139	317	87,482
May ..	57,874	40,436	7,337	972	1,046	1,370	2,696	2,582	4,578	118,891	195	364	361	600	2,305	331	123,047
June ..	45,471	44,834	5,603	841	712	1,421	4,077	2,178	2,730	107,867	148	405	127	600	1,080	101	110,348
July ..	42,861	60,482	7,330	884	310	1,767	2,494	4,253	4,045	124,426	169	343	298	600	1,035	443	127,313
Aug. ..	45,872	46,631	8,139	994	75	1,593	2,640	4,545	7,337	117,776	285	308	328	600	1,233	327*	120,857
Sept. ..	58,892	44,024	9,985	1,258*	61	1,743	2,404	3,247	9,303	130,917	100	323	260*	600	1,295	349*	135,784
Oct. ..	52,767	50,139	8,127	1,332*	509	1,693	2,564	3,355	2,082	122,568	200*	600*	200*	600	1,860	200*	126,228
Nov. ..	36,045	36,985	5,623	1,331*	1,295	1,137	3,370	3,463	6,715	95,954	200*	600*	200*	600	1,500*	200*	99,254
Dec. ..	56,263	34,630	10,700	2,074	1,028	3,520	5,343	9,000	123,899	200*	600	1,500*	200*	600	1,500*	200*	127,189

* Estimated. Guayule rubber imports into U.S.A. provisional until export figures from Mexico are received. Source: Statistical Bulletin of the International Rubber Regulation Committee.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES

Light face type \$1.00 per line (ten words) Light face type 40c per line (ten words) Light face type 75c per line (ten words)
 Bold face type \$1.25 per line (eight words) Bold face type 55c per line (eight words) Bold face type \$1.00 per line (eight words)

Allow nine words for keyed address.

SITUATIONS WANTED RATES

SITUATIONS OPEN RATES

Light face type 75c per line (ten words)

Bold face type \$1.00 per line (eight words)

Replies forwarded without charge

SITUATIONS WANTED

RUBBER CHEMIST, ELEVEN YEARS' EXPERIENCE WITH large and small companies in compounding and processing rubber goods and all synthetics here and abroad. Good experience with latex, airfoam sponge, cushions, and dipped goods. Available on short notice. Location immaterial, also South America. Excellent references. Practical man. 37 years old. Address Box No. 220, care of INDIA RUBBER WORLD.

TEXTILE EXPERT-PURCHASING AGENT, THOROUGHLY EXPERIENCED in rubber footwear production. Now employed in similar position desires change. 31 years of age. Address Box No. 225, care of INDIA RUBBER WORLD.

SUPERINTENDENT DESIRES CHANGE. CAPABLE DEVELOPMENT engineer, compounder, compiler of manufacturing specifications and factory costs, production organizer and sales engineer. 18 years' experience in mechanical, sponge and synthetic rubber goods. Address Box No. 227, care of INDIA RUBBER WORLD.

CHEMIST, OVER 20 YEARS OF VARIED EXPERIENCE IN DEVELOPMENT, PRODUCTION AND SALES SERVICE OF RUBBER GOODS, INCLUDING ADHESIVES, SEALERS, PAINTS, INKS, SYNTHETICS, TIRES, TUBES AND MECHANICALS, WANTS POSITION OF RESPONSIBILITY. Address Box No. 228, care of INDIA RUBBER WORLD.

RUBBER ENGINEER WISHES NEW POSITION, COMPETENT SUPERINTENDENT OR PRODUCTION MANAGER, DEVELOPMENT SUPERVISOR, FACTORY COSTS & SPECIFICATIONS, COMPOUNDER, LABORATORY CONTROL TECHNICIAN. BROAD YEARS OF EXPERIENCE MANUFACTURING SPONGE, SYNTHETIC & MECHANICAL RUBBER GOODS. EXPERT IN USING RECLAIMS. Address Box No. 229, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

CHEMIST—AS ASSISTANT IN SMALL LABORATORY OF WELL-ESTABLISHED PLANT, EXPERIENCE IN PROOFED GOODS DESIRABLE, BUT NOT ESSENTIAL. STATE SCHOOLING, EXPERIENCE, AND IDEA OF SALARY EXPECTED. ADDRESS BOX NO. 223, CARE OF INDIA RUBBER WORLD.

SALES MANAGER WANTED

Established Company looking for Sales Manager. Location Eastern United States. Excellent opportunity for larger responsibilities.

Selling experience and some production experience in hard rubber industry is essential. Age 40-50 preferred. Good personality important.

In reply, please give date and place of birth, education, chronological record of experience in detail showing dates, company name, position held, duties and salary—also small photograph, not returnable.

All answers will be considered confidential; references and present employers will not be checked until agreeable to applicant. Interviews with selected applicants will be arranged for at our expense. Address reply to Box No. 222, care of INDIA RUBBER WORLD.

SERICITE
MOULD LUBRICANT
Pat. No. 1591767

Sole Licensed Sellers

WHITTAKER, CLARK & DANIELS, INC.
260 West Broadway, New York City

BUSINESS OPPORTUNITY

TRENTON PLANT PREPARED TO DO CUSTOM MILLING, EXPERT COMPOUNDING AND PROCESS WORK FOR ALL REQUIREMENTS. ADDRESS BOX NO. 221, CARE OF INDIA RUBBER WORLD.

FOSTER D. SNELL, INC.

Our staff of chemists, engineers and bacteriologists with laboratories for analysis, research, physical testing and bacteriology are prepared to render you every form of chemical service

304 Washington Street

Brooklyn, N. Y.

EDWARD FOX

Consulting Technologist

RUBBER LATEX

294 Washington St.

Boston, Mass.

MECHANICAL MOLDED RUBBER GOODS

Sponge Rubber: Sheeted—Die Cut—Molded
We Solicit Your Inquiries
THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

COLORS for RUBBER

Red Iron Oxides

Green Chromium Oxides

Green Chromium Hydroxides

Reinforcing Fillers and Inerts

C. K. WILLIAMS & CO.
EASTON, PA.

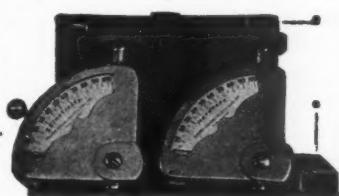
An International Standard of Measurement for—
Hardness • Elasticity • Plasticity of Rubber, etc.

Is the DUROMETER
and ELASTOMETER
(23rd year)

These are all factors vital in the selection of raw material and the control of your processes to attain the required modern standards of quality in the finished product. Universally adopted.

It is economic extravagance to be without these instruments. Used free handed in any position or on bench stands, convenient, instant registrations, fool proof. Ask for our Descriptive Bulletins, and Price List R-4 and R-5.

THE SHORE INSTRUMENT & MFG. CO.
Van Wyck Avenue and Carl Street, JAMAICA, NEW YORK
Agents in all foreign countries.



LEGAL

Latex Patents Held Invalid

In the suit of the United States Rubber Co., New York, N. Y., and Dewey & Almy Chemical Co., Cambridge, Mass., against Mimex Co., Inc., of Long Island City, N. Y., alleging infringement of U. S. patents Nos. 1,582,219 and 1,765,134, relating to latex compounds for sealing cans, Judge Galston in the Court of First Jurisdiction, on January 24, ruled against the plaintiffs on the ground of invalidity. It is understood that the decision is being appealed.

United Carbon Wins Patent Suit

In a decision handed down on February 17 by District Judge A. D. Barksdale at Charleston, W. Va., the United Carbon Co. was found not guilty of infringement of the Wiegand-Venuto patent, for producing free-flowing, dustless carbon black pellets, as charged in the suit instituted by Binney & Smith Co. In dismissing the suit on the ground that the plaintiff had no cause for action, the Judge held that there were recognizable differences between the product described in the plaintiff's patent and the defendant's product relative to degree of porosity and purity and degree of uniformity in size.

Financial

(Continued from page 65)

N. J. For 1940: net income, after providing \$911,821.20 for depreciation and

\$886,500 for federal and state income taxes, and the excess profits tax, \$1,696,926, equal to \$2.70 each on 628,100 capital shares, against \$1,605,296, or \$2.54 each on 631,600 shares, in 1939; current assets \$11,161,719, nearly 5 times current liabilities, against current assets of \$10,293,507 on December 31, 1939. The company had no banking or funded debt or other capital obligation outstanding. The assets, liabilities, and net income of the wholly owned and Canadian subsidiary were not included in this report.

Russell Mfg. Co., Middletown, Conn. Year ended November 30: net income, \$240,545, equal to \$3.74 a share on 64,238 common shares, against \$56,767, or \$1.23 each on 46,240 shares, in the preceding year; net sales, \$4,406,461, against \$3,466,058.

St. Joseph Lead Co., New York, N. Y., and subsidiaries. For 1940: net profit, after all charges including \$254,745 excess profits tax provision, \$5,111,942, equal to \$2.61 each on 1,955,680 capital shares, excluding 41,160 in treasury, against \$5,292,907, or \$2.70 a share in 1939; net sales, \$38,507,829, against \$30,362,605.

Sun Oil Co., Philadelphia, Pa., and subsidiaries. For 1940: net income, \$7,969,068, against \$6,959,677 in 1939; current assets, \$43,025,672, and current liabilities, \$20,473,370, against the respective figures of \$45,891,879 and \$16,046,846 on December 31, 1939.

Thermoid Co., Trenton, N. J., and domestic subsidiaries. For 1940: net income, \$602,740, equal, after preferred dividends, etc., to \$1.01 a share on the 476,388 common shares, against

\$432,304, or 65¢ a common share, in 1939. For the final quarter of 1940 net income was \$209,120, compared with \$188,016 for the similar period in 1939.

United Carbon Co., Charleston, W. Va., and subsidiaries. For 1940: net profit, \$1,330,331, equal to \$3.36 a share on 397,885 shares of no-par common stock, against \$1,518,266, or \$3.81 a share, in 1939; net sales, \$8,483,357, against \$8,575,309; federal income taxes, \$725,000, against \$392,000; current assets on December 31, 1940, amounted to \$3,821,215, current liabilities, \$1,355,965, compared with \$3,678,980 and \$835,679, respectively, at the end of 1939; inventories, \$1,009,133, against \$764,590.

United States Rubber Co., New York, N. Y. For 1940: consolidated net profit, after charges, reserves, and taxes, \$11,425,241, equal, after full dividend requirements of \$8 a preferred share, to \$3.58 each on 1,736,092 common shares outstanding, against \$10,218,849, or \$3.18 a common share in 1939; net sales, \$228,988,780, the highest in two decades, against \$195,310,846; current assets, \$121,108,117, current liabilities, \$38,562,844, against \$105,219,989 and \$30,710,115, respectively, on December 31, 1939; cash, \$20,010,453, against \$14,426,771; direct taxes, \$26,004,002, against \$18,246,232. Foreign assets were valued at \$35,155,488, or about 18% of the total assets of \$192,805,965, and about \$800,000 less than in 1939.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. For 1940: net profit, \$18,985,428, equal, after federal income taxes and other deductions, to \$7.10 a share on the combined 79,974 7% preferred shares and 2,592,155 common shares, against \$13,854,365, or \$5.19 each on the combined shares, in 1939; orders booked, \$400,477,724, a record high, against \$214,399,044; sales billed, \$239,431,447, against \$176,858,811; unfilled orders at the year end, \$223,685,737, against \$70,821,960.

Minnesota Mining & Mfg. Co., St. Paul, Minn. For 1940: net profit, \$4,188,786, equal to \$4.36 each on 961,260 common shares, against \$4,364,974, or \$4.54 a share in the preceding year.

Dividends Declared

COMPANY	STOCK	RATE	PAYABLE	STOCK OF RECORD
Belden Mfg. Co.	Com.	\$0.25 irreg.	Mar. 1	Feb. 17
Brunswick-Balke-Collender Co.	Pfd.	\$1.25 q.	Apr. 1	Mar. 20
Canada Wire & Cable Co., Ltd.	"A"	\$1.00 q.	Mar. 15	Feb. 28
Canada Wire & Cable Co., Ltd.	"B"	\$0.50 q.	Mar. 15	Feb. 28
Canada Wire & Cable Co., Ltd.	Pfd.	\$1.625 q.	Mar. 15	Feb. 28
Collins & Aikman Corp.	Com.	\$0.25	Mar. 1	Feb. 18
Collins & Aikman Corp.	Pfd.	\$0.565 q.	Mar. 15	Feb. 28
Crown Cork & Seal Co. Inc.	Com.	\$0.25	Mar. 15	Mar. 1
Dewey & Almy Chemical Co.	Cl. B	\$0.25	Mar. 15	Mar. 1
Dewey & Almy Chemical Co.	\$5 Cum. Cv. Pfd.	\$1.25	Mar. 15	Mar. 1
Dominion Textile Co. Ltd.	Com.	\$1.25 q.	Apr. 1	Mar. 15
Dominion Textile Co. Ltd.	7% Pfd.	\$1.75 q.	Apr. 15	Mar. 31
E. I. du Pont de Nemours & Co., Inc.	Com.	\$1.75 interim	Mar. 14	Feb. 24
E. I. du Pont de Nemours & Co., Inc.	Pfd.	\$1.125 q.	Apr. 25	Apr. 10
Electric Auto-Lite Co.	Com.	\$0.75	Apr. 1	Mar. 20
Electric Storage Battery Co.	Com.	\$0.50 q.	Mar. 31	Mar. 10
Electric Storage Battery Co.	Pt. Pfd.	\$0.50 q.	Mar. 31	Mar. 10
Flintkote Co.	Com.	\$0.25 irreg.	Mar. 25	Mar. 15
General Motors Corp.	Com.	\$0.75 irreg.	Mar. 12	Feb. 13
General Motors Corp.	\$5 Pfd.	\$1.25 q.	May 1	Apr. 7
General Tire & Rubber Co., Inc.	Com.	\$0.50	Feb. 28	Feb. 18
B. F. Goodrich Co.	Com.	\$0.25 special	Mar. 14	Mar. 7
B. F. Goodrich Co.	\$5 Pfd.	\$1.25	Mar. 31	Mar. 20
Goodyear Tire & Rubber Co., Inc.	Com.	\$0.25 q.	Mar. 15	Feb. 21
Goodyear Tire & Rubber Co., Inc.	Com.	\$0.25 extra	Mar. 15	Feb. 21
Goodyear Tire & Rubber Co., Inc.	Pfd.	\$1.25 q.	Mar. 15	Feb. 21
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	\$0.62 q.	Apr. 1	Mar. 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	\$1.50 extra	Apr. 1	Mar. 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	Pfd.	\$0.625 q.	Apr. 1	Mar. 15
Hercules Powder Co.	Com.	\$0.60	Mar. 25	Mar. 14
Hewitt Rubber Corp.	Cap.	\$0.25	Mar. 15	Mar. 1
Midwest Rubber Reclaiming Co.	\$4 Pfd.	\$1.00 q.	Mar. 1	Feb. 8
Okonite Co.	Com.	\$1.50 irreg.	Feb. 1	Jan. 28
Phelps Dodge Copper Corp.	Com.	\$0.25	Mar. 8	Feb. 21
Raybestos-Manhattan, Inc.	Com.	\$0.375 inc.	Mar. 15	Feb. 28
Russell Mfg. Co.	Com.	\$0.375 irreg.	Mar. 15	Feb. 28
Thermoid Co.	Pfd.	\$0.75 q.	Mar. 15	Mar. 3
United Elastic Corp.	Com.	\$0.15	Mar. 24	Mar. 6
Westinghouse Electric & Mfg. Co.	Com.	\$1.00	Mar. 5	Feb. 14
Westinghouse Electric & Mfg. Co.	Pt. Pfd.	\$1.00	Mar. 5	Feb. 14

Year	Pounds (d.r.c.)	Value
1938	26,606,048	\$4,147,318
1939	61,460,003	10,467,552
1940	75,315,775	14,543,975
1940		
Jan.	7,639,568	1,412,728
Feb.	4,862,684	947,524
Mar.	7,561,780	1,473,056
Apr.	8,430,063	1,608,156
May	8,029,276	1,523,879
June	5,490,018	1,004,007
July	5,109,739	993,411
Aug.	5,102,983	1,022,531
Sept.	6,614,718	1,337,487
Oct.	2,590,088	512,153
Nov.	5,969,192	1,169,086
Dec.	7,915,666	1,539,957

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1938	26,606,048	\$4,147,318
1939	61,460,003	10,467,552
1940	75,315,775	14,543,975
1940		
Jan.	7,639,568	1,412,728
Feb.	4,862,684	947,524
Mar.	7,561,780	1,473,056
Apr.	8,430,063	1,608,156
May	8,029,276	1,523,879
June	5,490,018	1,004,007
July	5,109,739	993,411
Aug.	5,102,983	1,022,531
Sept.	6,614,718	1,337,487
Oct.	2,590,088	512,153
Nov.	5,969,192	1,169,086
Dec.	7,915,666	1,539,957

Data from Leather and Rubber Division, Washington, D. C.

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

SCOOP! 4—84" Heavy Duty Mills, complete; 1—60" several smaller sizes; 1—Farrel 24"x24" 12-deck Hydraulic Press, 15" ram; 12—24"x48" Hydraulic Presses, 14" ram; 7—Triplex Hydraulic Pumps, 18 to 35 GPM 1500 to 3000 lbs. per sq. in.; also Mills, Calenders, Tenders, etc. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: 2—U. S. BUREAU OF STANDARDS DYNAMOMETER Tire Testing Apparatus; 1—Two-Roll Water-Cooled Rubber Mill, 6" & 8" dia. x 9" face; 75-foot Link Belt Conveyor, 36" wide, Hydraulic Presses, Pumps, and Accumulators, Rubber Mills, etc. Send for latest bulletins. We buy your surplus equipment. STEIN EQUIPMENT CORP., 426 BROOME ST., NEW YORK CITY.

THROPP 16"x42" MIXING MILL, CONTINUOUS BED PLATE, spur gear reduction, 50 HP Slip-Ring Motor, safety brake, complete, in first-class condition. W & P Jacketed Mixer, 20 gal. capacity, Class BB, Naben blades, hand wheel tilt, excellent condition. Other equipment available includes Vulcanizers, Calenders, Spreaders, Tenders, Hydraulic Presses, Pumps & Accumulators, Boilers, etc. INDUSTRIAL EQUIPMENT CO., 870 Broad Street, Newark, N. J.

FOR SALE: FARREL 42x42, FOUR-OPENING HYDRAULIC PRESS, steel plates, 22" ram. Also Accumulator System. Erie 10" Strainer. Address Box No. 226, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES WANTED

WANTED FOR USER: 1—NO. 3 or NO. 9 BANBURY MIXER; 3—Mills; 1—Calender; 5—Hydraulic Presses, with pumps and accumulators; 2—Tenders. No dealers. Address Box No. 224, care of INDIA RUBBER WORLD.

FINELY PULVERIZED—BRILLIANT COLORS for RUBBER

Chicago Representative Pacific Coast Representative
FRED L. BROOKE MARSHALL DILL
228 N. La Salle St. San Francisco
Cleveland, PALMER-SCHUSTER CO., 975-981 Front St.

Manufactured by
BROOKLYN COLOR WORKS, INC.
Morgan and Norman Avenues Brooklyn, N. Y.

GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS



HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS

319-323 FRELINGHUYSEN AVE.

CABLE "URME"

NEWARK, N. J.

UNITED RUBBER MACHINERY EXCHANGE

World Wide Service



The World's Largest
Rebuilder of Rubber
Mill Machinery!

FACTORY REBUILT and GUARANTEED RUBBER MILL MACHINERY

Accumulators
Calenders
Cutting Machines

Mills
Pumps
Mixers
Churns
Motors
Presses
Spreaders
Vulcanizers
Tubers

"Equipped to Furnish Complete Plants"

L. ALBERT & SON

OFFICES AND PLANTS

TRENTON, N. J. ★ AKRON, OHIO ★ LOS ANGELES, CALIF.
European Office — Andre Berjonneau, 33 Blvd. des Batignolles, PARIS (VIII) FRANCE
Villers-Sur-Le-Roule par Gaillon (Eure) FRANCE

Rims Approved and Branded by The Tire & Rim Association, Inc.

Size	1940		1939		Size	1940		1939		Size	1940		1939		
	Number	%	Number	%		Number	%	Number	%		Number	%	Number	%	
Drop Center Rims, 16" Dia. and Under															
12x2.50C	30,120	0.2	18x2.50C	5,188	0.6	18x3.00D	2,163	0.2	1,304	0.3	DW11-26	350	0.0	350	0.0
15x3.00D	66,260	0.5	124,266	0.9	18x3.25E	2,204	0.2	1,304	0.3	DW10-28	2,331	0.3	2,331	0.3	
15x3.50D	131,597	0.9	96,062	0.7	18x4.00E	5,762	0.6	1,304	0.3	DW11-28	3,529	0.4	3,529	0.4	
15x4.50E	131,597	0.9	96,062	0.7	18x4.19F	773	0.1	1,304	0.3	DW11-30	374	0.0	374	0.0	
15x5.00E	173,772	1.2	18x5.00F	19,880	2.2	19x3.00D	26,319	5.2	19,880	2.2	DW11-32	3,353	0.4	3,353	0.4
15x5.00F	204,471	1.4	166,443	1.2	19x5.50F	66,273	7.3	27,187	5.3	DW9-36	908	0.1	908	0.1	
15x5.50F	471,759	3.3	215,624	1.6	19x3.00D	19,880	2.2	19,880	2.2	DW10-36	1,574	0.2	1,574	0.2	
16x3.00D	35,128	0.2	19x4.00E	19,880	2.2	19x4.00E	19,880	2.2	19,880	2.2	DW11-36	1,049	0.1	1,049	0.1
16x3.50D	229,129	1.6	336,352	2.5	20x4.50E	10,586	1.2	6,460	0.8	DW12-26	2,303	0.3	2,303	0.3	
16x4.00E	7,058,735	48.7	7,118,783	52.7	20x5.00F	12,333	1.4	4,264	0.8	DW12-28	1,809	0.2	1,809	0.2	
16x4.25E	559,796	3.9	867,773	6.4	20x5.50F	9,905	1.1	1,245	0.2	DW8-38	18,374	2.0	18,374	2.0	
16x4.50E	3,396,007	23.4	3,056,041	22.6	21x3.00D	6,287	0.7	1,245	0.2	DW9-38	53,063	5.9	53,063	5.9	
16x5.00E	514,203	3.5	1,298,234	9.6	21x2.50E	8,771	1.0	17,231	3.4	DW10-38	23,704	2.6	23,704	2.6	
16x5.00F	1,394,209	11.0	1,298,234	9.6	22x4.50E	8,771	1.0	17,231	3.4	DW11-38	5,263	0.6	5,263	0.6	
16x5.50F	35,890	0.2	17,510	0.1	24x3.00D	814	0.1	63	0.0	Cast Rims					
16x6.00F	16,665	0.1	17,999	0.1	24x3.50F	814	0.1	63	0.0	10x5.00F	968	35.0	460	26.1	
Drop Center Rims, 16" Dia., and Under, Low Flange															
All Sizes	14,487,621	99.2	27,348	0.3	30x3.00D	977	0.1	108	0.0	10x6.00F	608	22.0	538	29.9	
Drop Center Rims, 17" Dia. and Over					36x3.00D	2,098	0.2	2,478	0.5	15x2.50D	2	0.1	2	0.1	
All Sizes	1,166	0.0	130,787	1.0	36x4.00E	87	0.0	24x10.00	16	0.6	126	7.0	126	7.0	
Flat Base Rims for Balloon Tires					36x4.50E	3,097	0.3	3,829	0.7	24x11.25	15	0.5	15	0.5	
All Sizes	116,067	0.8	6,470	0.0	40x3.00D	590	0.1	219	0.0	24x13.00	173	6.3	12	0.7	
Flat Base Rims for High Pressure Tires					40x4.00E	95	0.0	95	0.0	24x15.00	827	29.9	660	36.6	
All Sizes	5,345	0.0	149	0.0	40x5.50F	184	0.0	184	0.0	32x18.00	36	1.3	36	1.3	
Clincher Rims					44x4.00E	205	0.0	205	0.0	40x15.00	112	4.0	112	4.0	
All Sizes	891	0.0	891	0.0	44x4.50E	205	0.0	205	0.0	Airplane Rims	2,437	0.0	3,548	0.0	
15" Truck and Bus Rims					20x5.50R	1,343	0.1	30,162	5.9	All Sizes	2,437	0.0	3,548	0.0	
15x5	8,280	0.2	4,906	0.1	24x5.50R	6,154	0.7	30,162	5.9	Grand Total	19,378,558		17,471,914		
15x8	3,633	0.1	2,383	0.1	32x5.50R	95	0.0	30,162	5.9						
15x9/10	46	0.0	46	0.0	36x5.50R	830	0.1	10,584	21						
17" Truck and Bus Rims					40x5.50R	2,120	0.2	3,978	0.8						
17x5	45,607	1.2	53,429	1.6	40x6.00R	2,858	0.3	6,488	1.5						
17x6	114,501	3.0	58,304	1.7	40x6.50R	8,06	0.1	3,360	0.5						
17x7	382	0.0	382	0.0	40x7.00R	47,561	5.3	56,731	11.1						
18" Truck and Bus Rims					40x8.00R	1,320	0.1	1,478	0.3						
18x5	9,388	0.2	444	0.0	40x8.50R	1,757	0.2	2,384	0.4						
18x6	3,437	0.1	404	0.0	40x9.00R	173	0.0	130	0.0						
18x7	13,292	0.4	25,367	0.4	40x9.50R	1,279	0.2	1,279	0.2						
18x8	98,386	2.5	27,495	0.8	40x10.00R	1,03	0.0	103	0.0						
18x9/10	3,455	0.1	3,420	0.1	40x10.50R	3,022	3.7	13,636	2.7	1939	8,664,505	57,612,731	57,508,775		
19" Truck and Bus Rims					W-8.24	73,994	8.2	11,030	2.2	1940	9,178,537	59,352,643	59,155,326		
19x11	35	0.0	35	0.0	W-9.24	547	0.1	45	0.0	Jan.	9,797,253	5,472,043	4,846,991		
20" Truck and Bus Rims					W-10.24	358	0.0	30,162	5.9						
20x5	521,842	13.5	619,660	18.0	W-11.24	993	0.1	30,162	5.9						
20x6	1,345,834	34.9	1,388,513	40.3	W-10.26	456	0.1	30,162	5.9						
20x7	1,005,639	26.1	751,842	21.8	W-11.26	42	0.0	30,162	5.9						
20x8	301,066	7.8	253,953	7.4	W-6.28	637	0.1	30,162	5.9						
20x10.50	40,880	1.1	30,646	0.9	W-6.28	2,313	0.3	3,978	0.8						
20x9/10	4,648	0.1	6,430	0.1	W-6.28	6,924	0.8	3,978	0.8						
22" Truck and Bus Rims					W-10.28	21,661	2.4	9,793	1.9						
22x7	143	0.0	310	0.0	W-11.28	408	0.0	30,162	5.9						
22x8	22,090	0.6	16,437	0.5	W-6.32	12,801	1.4	4,973	1.0	1941					
22x9/10	13,450	0.3	8,089	0.2	W-7.32	27,013	3.0	27,013	3.0	Jan.	2,292,704	2,420,947	133,340		
24" Truck and Bus Rims					W-8.32	7,386	0.8	7,386	0.8						
24x5	12,491	0.3	12,941	0.4	W-7.38	4,220	0.5	4,220	0.5						
24x6	5,751	0.1	3,214	0.1	W-10.36	12,672	1.4	1,528	0.3	1939	7,035,671	50,648,556	51,190,314		
24x8	6,383	0.2	3,043	0.1	W-7.38	5,789	0.6	6,053	1.2	1940	7,014,154	52,350,867	52,306,767		
24x9/10	19,590	0.5	11,564	0.3	W-8.38	19,692	2.2	2,254	0.4	1941					
24x11	3,724	0.1	6,430	0.2	W-9.38	13,565	1.5	2,526	0.5	Jan.	7,732,655	5,168,380	4,527,427		
Semi-Drop Center Rims, 16" for Light Trucks					W-10.38	1,756	0.2	715	0.1						
15x5.50F	1,198	0.0	1,198	0.0	W-4.40	462	0.1	462	0.1						
16x4.50E	46,588	1.2	54,344	1.6	W-5.40	1,075	0.1	321	0.0						
16x5.50F	200,077	5.2	106,211	3.1	W-5.40	1,075	0.1	321	0.0						
Drop Center Tractor and Implement Rims					W-8.40	3,627	0.4	3,627	0.4						
12x2.50C	8,222	0.9	4,901	1.0	W-9.40	187	0.0	187	0.0						
12x3.00D	24,136	2.7	14,441	2.8	W-10.40	4,158	0.5	4,158	0.5						
13x5.50F	13,412	1.5	19,024	3.6	W-4.44	151	0.0	151	0.0						
15x2.50C	160	0.0	160	0.0	W-4.54	120	0.0	120	0.0						
15x3.00D	134,904	14.9	41,808	8.2	W-5.44	399	0.0	399	0.0						
15x4.50E	275	0.1	W-6.44	1,957	0.2	W-6.44	1,957	0.2	1,957	0.2					
15x5.50F	1,593	0.3	W-7.44	526	0.1	W-7.44	526	0.1	526	0.1					
16x3.00D	7,687	0.8	16,174	3.2	DW11-24	473	0.1	473	0.1						
16x5.50F	146	0.0	146	0.0	DW9-26	674	0.1	674	0.1						
16x6.00F	3,612	0.7	3,612	0.7	DW10-26	2,136	0.2	2,136	0.2						

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

World Net Imports of Crude Rubber—Long Tons

Year	U.S.A.	U.K. ^f	Argen-	Australia	Belgium	Canada	France	Greater	Italy	Japan	Poland	Sweden	U.S.S.R.	Rest of	Total
1938...	406,300	168,172	7,700	12,300	11,300	25,700	58,100	107,900	28,200	46,300	7,900	8,300	26,800	49,200	928,000
1939...	486,348	70,800 ^g	9,552	15,426	9,593	32,508	33,751 ^g	62,344 ^g	12,351 ^g	42,351	5,415 ^g	7,965 ^g	14,000 ^g	61,866	603,8421
1940															
Jan.	71,541	...	1,049	921	891	5,047	...	...	...	...	5,243	...	...	...</

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

UNMANUFACTURED	December, 1940		Twelve Months Ended December, 1940	
	Quantity	Value	Quantity	Value
Crude rubber, etc.	lb. 16,321,954	\$3,244,746	114,215,803	\$22,962,210
Latex (dry weight)	lb. 335,995	93,835	3,530,198	1,013,625
Gutta percha	lb. 8,126	9,290	18,860	14,426
Rubber, recovered	lb. 1,164,500	69,741	16,065,500	847,192
Rubber, powdered, and gutta percha scrap	lb. 658,700	12,460	12,467,300	114,165
Balata	lb. 269	284	20,498	9,872
Rubber substitute	lb. 51,390	13,123	391,900	104,259
Totals	18,540,844	\$3,443,479	146,710,059	\$25,065,749
PARTLY MANUFACTURED				
Hard rubber comb blanks....		\$5,155		\$47,745
Hard rubber, n. o. s.	lb. 2,091	1,993	42,276	39,878
Rubber thread no covered.	lb. 1,381	1,762	40,743	37,760
Totals	3,472	\$8,910	83,019	\$125,383
MANUFACTURED				
Bathing shoes	prs.	.....	29,342	\$7,482
Belting		\$12,921	.....	163,878
Hose		46,765	.....	284,274
Packing		6,126	.....	94,187
Boots and shoes	prs.	206	523	7,621
Canvas shoes with rubber soles	prs.	203	138	125,527
Clothing, including water-proofed		2,909	.....	45,369
Raincoats	no.	1,604	5,435	21,705
Gloves	doz. prs.	529	1,765	7,644
Hot water bottles....		79	.....	9,618
Liquid rubber compound....		.....	.....	153,920
Tires, bicycle	no.	1,351	920	41,659
Pneumatic	no.	4,763	231,734	23,934
Sold for automobiles and motor trucks	no.	16	886	282
Other solid tires....		1,025	.....	11,092
Inner tubes	no.	4,063	78,537	120,836
Bicycle	no.	520	145	31,502
Mats and matting....		17,552	.....	6,356
Cement		12,769	.....	95,467
Golf balls	doz. prs.	353	990	34,175
Heels	pr.	4,100	304	80,362
Other rubber manufactures....		200,178	.....	1,984,860
Totals .....	.....	\$621,711	.....	\$9,923,689
Totals, rubber imports....	.....	\$4,074,100	.....	\$35,114,821

Exports of Domestic and Foreign Rubber Goods

UNMANUFACTURED	Produce	Reexports	Produce	Reexports
	of Canada	of For.	of Canada	of For.
	Value	sign Goods	Value	sign Goods
Waste rubber	\$16,862	.....	\$168,795	.....
PARTLY MANUFACTURED				
Belting	\$29,404	.....	\$490,885	.....
Bathing caps ....	.....	.....	153	.....
Canvas shoes with rubber soles	27,761	.....	518,571	.....
Boots and shoes	154,601	.....	4,022,184	.....
Clothing, including water-proofed	14,951	.....	290,235	.....
Heels	3,148	.....	112,093	.....
Hose	164,643	.....	1,087,103	.....
Soles	1,880	.....	122,619	.....
Soling slabs	542	.....	27,670	.....
Tires, pneumatic	272,205	.....	4,981,302	.....
Not otherwise provided for ....	.....	.....	56	.....
Inner tubes	34,984	.....	479,373	.....
Other rubber manufactures....	44,912	.....	645,967	.....
Totals	749,031	.....	\$12,778,211	.....
Totals, rubber exports....	765,893	.....	\$12,947,006	.....

Imports by Customs Districts

	December, 1940		December, 1939	
	*Crude Rubber Pounds	Value	*Crude Rubber Pounds	Value
Massachusetts	22,138,578	\$3,971,341	17,789,109	\$3,114,763
Buffalo	94,705	14,019	.....	.....
New York	162,338,195	28,029,680	117,599,404	19,830,333
Philadelphia	2,432,434	404,210	3,346,866	524,807
Maryland	17,199,749	3,031,420	3,235,464	514,084
Mobile	93,071	16,358	112,896	15,288
New Orleans	2,083,078	336,630	3,505,960	558,111
Laredo	385,300	38,919	.....	.....
El Paso	88,300	9,139	100,800	9,898
Los Angeles	8,591,569	1,484,515	10,419,587	1,743,273
San Francisco	950,484	163,600	.....	.....
Oregon ....	.....	.....	44,800	7,000
Ohio	2,248,000	337,119	3,714,192	714,950
Colorado	840,000	135,566	56,000	8,292
Totals	219,483,863	\$37,972,516	159,925,078	\$27,040,799

*Crude rubber including latex dry rubber content.

RUBBER PRODUCTS

last longer, have greater
saleability and display
value when finished with

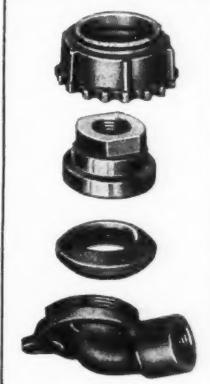
Franklin's

F 11

Want those Rubber Products of yours to move faster? Give them a rich, satin finish with F-11, an odorless, quick drying emulsion that produces a smooth, lustrous surface, retards oxidation and enables the product to retain its natural rubber-like appearance. Contains no solvent. Can be sprayed or dipped. Non-toxic. Send for free sample.

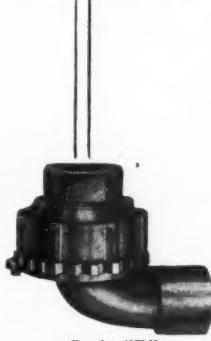
FRANKLIN RESEARCH CO.
PHILADELPHIA, PENNA.
DISTRIBUTORS AND WAREHOUSES IN ALL PRINCIPAL CITIES

Just 4 Parts!



ON platen presses, or tire and tube molds, or wherever a swing joint is required in the rubber industry, you'll find FLEXO JOINTS. They're there because they have proven dependable and efficient. And they are extremely simple both in construction and to install and service.

Made in four styles and in standard pipe sizes from $\frac{1}{4}$ inch to 3 inches. Your regular supply house has them or order direct from



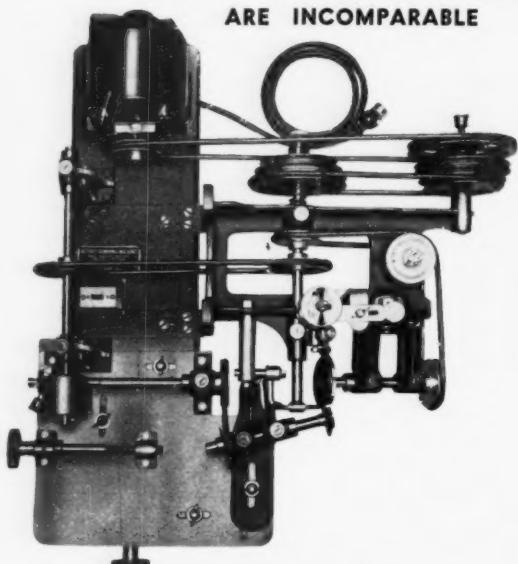
FLEXO SUPPLY CO.
4218 Olive Street
St. Louis, Mo.

== FLEXO ==

Style "B"

The World's Trimmers
T. W. MORRIS
TRIMMING
MACHINES

ARE INCOMPARABLE



MECHANICAL GOODS TRIMMER
 MAIL ADDRESS — 6312 WINTHROP AVENUE
 CHICAGO, ILL.

OUTSTANDING
ORGANIC PIGMENTS
FOR THE COLORING
OF RUBBER



GENERAL DYESTUFF
CORPORATION

435 HUDSON STREET, NEW YORK, N. Y.

Boston, Mass. Philadelphia, Pa. Chicago, Ill.

Providence, R. I. Charlotte, N. C. San Francisco, Cal.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	November, 1940	Quantity	Value	Eleven Months Ended November, 1940	Quantity	Value
UNMANUFACTURED—Free						
Liquid latex (solids). <i>lb.</i>	5,969,192	\$1,169,086	67,771,250	\$13,053,509		
Jelutong or pontianak. <i>lb.</i>	997,067	152,297	14,222,192	2,107,261		
Balata. <i>lb.</i>	150,171	43,939	1,330,571	261,029		
Guuta percha. <i>lb.</i>	392,797	92,466	4,408,026	817,791		
Guayule. <i>lb.</i>	879,000	78,587	7,516,421	695,421		
Scrap and reclaimed. <i>lb.</i>	628,838	13,747	8,311,503	162,192		
Totals	9,017,065	\$1,550,122	103,559,963	\$17,097,203		
Misc. rubber (above), 1,000 lbs. <i>lb.</i>	9,017	\$1,550,122	103,560	\$17,097,203		
Crude rubber, 1,000 lbs. <i>lb.</i>	156,449	26,917,136	1,537,777	266,692,074		
Totals 1,000 lbs. <i>lb.</i>	165,466	\$28,467,258	1,641,337	\$283,789,277		
Chicle, crude. <i>lb.</i>	1,001,552	\$386,351	10,170,500	\$3,398,184		
MANUFACTURED—Dutiable						
Rubber tires. <i>no.</i>	119	\$3,382	36,687	\$205,791		
Rubber boots, shoes and overshoes. <i>prs.</i>	2,076	296	117,104	29,730		
Rubber soled footwear with fabric uppers. <i>prs.</i>	162,635	30,703	1,252,852	237,008		
Golf balls. <i>no.</i>	5,424	662	567,250	53,662		
Lawn tennis balls. <i>no.</i>			908,721	89,053		
Other rubber balls. <i>no.</i>	143,124	3,031	1,861,071	49,717		
Other rubber toys. <i>no.</i>		1,207		21,724		
Hard rubber combs. <i>no.</i>						
Other manufacturers of hard rubber						1,748
Friction or insulating tape. <i>lb.</i>	4,842	3,990	57,826	37,408		
Belts, hose, packing, and in- sulating material						76,787
Druggists' sundries of soft rubber			451			30,057
Inflatable swimming belts, floats, etc. <i>no.</i>	8,372	483	438,655	29,622		
Other rubber and guuta percha manufacturers		45,540				346,460
Totals		\$89,745				\$1,208,767

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber. <i>lb.</i>	282,025	\$52,020	15,353,529	\$3,102,714
Balata. <i>lb.</i>	47,335	14,055	386,172	122,388
Other rubber, rubber substi- tutes and scrap. <i>lb.</i>			173,363	23,943
Rubber manufactures (includ- ing toys)		1,272		36,321
Totals		\$67,347		\$3,285,366

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed. <i>lb.</i>	1,520,847	\$83,143	23,973,955	\$1,206,120
Scrap. <i>lb.</i>	10,608,510	176,399	84,200,601	1,449,718
Cements. <i>gal.</i>	25,916	29,413	373,474	465,771
Rubberized auto cloth. <i>sq. yd.</i>	12,418	6,291	239,724	105,100
Other rubberized piece goods and hospital sheetings. <i>sq. yd.</i>	202,406	173,134	2,183,885	977,905
Boots. <i>prs.</i>	3,979	9,576	97,388	205,780
Shoes. <i>prs.</i>	8,005	8,005	159,211	112,858
Canvas shoes with rubber soles. <i>prs.</i>	58,241	40,268	541,649	427,844
Soles. <i>doz. prs.</i>	2,413	4,256	40,226	83,155
Heels. <i>doz. prs.</i>	30,180	16,756	291,433	160,080
Soling and top lift sheets. <i>lb.</i>	25,595	8,461	544,449	110,629
Gloves and mittens. <i>doz. prs.</i>	8,325	19,251	94,055	223,732
Water bottles and fountain syringes. <i>no.</i>	33,067	13,261	309,134	106,519
Other druggists' sundries...		84,763		768,658
Gum rubber clothing. <i>doz.</i>	16,301	28,840	205,558	439,089
Balloons. <i>gross</i>	41,559	34,668	238,327	207,414
Toys and balls. <i>doz.</i>		41,089		224,046
Bathing caps. <i>doz.</i>	2,078	3,811	47,694	83,415
Bands. <i>lb.</i>	16,452	7,453	170,697	80,506
Erasers. <i>lb.</i>	11,598	6,389	222,028	124,317
Hard rubber goods				
Electrical battery boxes. <i>no.</i>	29,057	20,223	240,920	171,496
Other electrical. <i>lb.</i>	46,427	11,014	502,925	179,470
Combs, finished. <i>doz.</i>	17,000	11,200	205,383	119,489
Other hard rubber goods		12,917		158,402
Tires				
Truck and bus casings. <i>no.</i>	66,751	1,956,130	532,730	13,604,759
Other auto casings. <i>no.</i>	43,425	593,484	473,486	5,350,405
Tubes, auto. <i>no.</i>	91,560	302,876	782,253	2,033,461
Other casings and tubes. <i>no.</i>	17,979	115,095	122,672	980,634
Solid tires for automobiles and motor trucks. <i>no.</i>	548	8,833	5,122	100,998
Other solid tires. <i>lb.</i>	22,873	5,982	348,960	63,420
Tire sundries and repair ma- terials. <i>lb.</i>	212,672	75,687	2,417,477	709,120
Rubber and friction tape. <i>lb.</i>	39,881	12,600	652,743	186,522
Fan belts for automobiles. <i>lb.</i>	27,741	16,320	349,589	189,083
Other rubber and balata belts. <i>lb.</i>	278,388	141,158	2,931,954	1,545,926
Garden hose. <i>lb.</i>	77,505	14,147	804,250	164,478
Other hose and tubing. <i>lb.</i>	980,621	399,253	7,958,657	3,318,410
Packing. <i>lb.</i>	138,984	52,798	1,396,136	657,706
Mats, matting, flooring, and tiling. <i>lb.</i>	186,546	23,182	1,146,000	155,009
Thread. <i>lb.</i>	32,278	26,733	605,706	452,318
Guuta percha manufacturers. <i>lb.</i>	13,225	7,164	1,103,355	344,936
Latex (d.r.c.) and rubber sheets processed for fur- ther manufacture. <i>lb.</i>	22,019	4,381	1,030,220	278,818
Other rubber manufacturers..		211,436		2,107,262
Totals		\$4,817,840		\$40,434,778

